ELECTRICAL REVIEW

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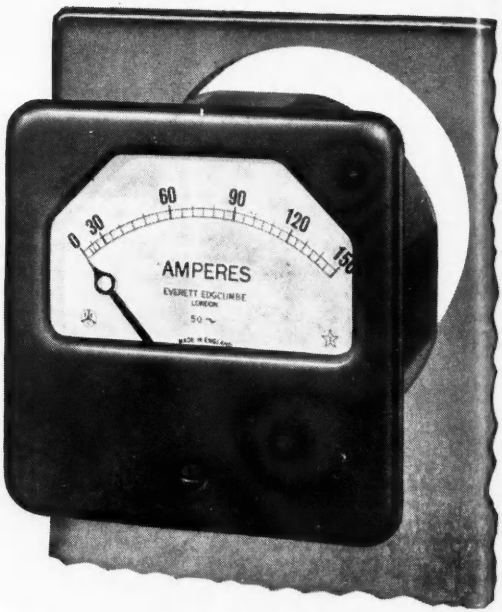

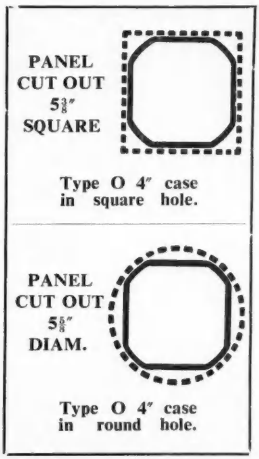

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ELECTRICAL REVIEW

24th APRIL, 1953

THE OLDEST ELECTRICAL PAPER • ESTABLISHED 1872 • VOL. CLII • NO. 17

B.I.F. and Exports

IN the last normal pre-war year, 1938, the value of direct electrical exports of all classes from this country was about £23 million, representing approximately 4·9 per cent of the country's total export trade. By last year the figure had risen to £218 million or 8·5 per cent of the total exports. Within the last three years the industry has increased its exports by one-third. In addition, a good deal of electrical equipment is incorporated in the exports of other industries. Thus both absolutely and relatively, and having full regard to altered values, the British electrical industry has to be credited with a remarkable achievement which has put it into the position of the second largest exporter.

These heights were not "attained by sudden flight," or as a result of continued Government exhortation, but by persistent hard work and attention to the various world markets. It is quite true that for some time after the war there was a very large unsatisfied demand, but in the last year or two although conditions have been very different electrical exports have continued their upward trend.

The world's electrical needs are ever-growing and there is no reason why Great Britain should not maintain her role as a principal supplier of these requirements, given a fair field. As Mr. Leslie Gamage shows in his article in this issue, this country will remain the world's leading importer and external trade must be a two-way business. We can therefore reasonably ask that our suppliers shall also be our customers and that we shall not be unduly handicapped by trade restrictions. We may, with equal reasonableness, ask our own Government not to make export trade more difficult by discouraging the development of the home market upon which that trade is based. The 1953–54 Budget seems to indicate an improvement in this respect.

These considerations form the background to the British Industries Fair which opens on Monday next and is surveyed in this

issue. It will be a good display and generally representative, although some important concerns are not participating. The primary object of the Fair is to stimulate export trade. The Coronation will result in attracting greater numbers of potential overseas customers to this country and it is to be hoped that they will arrive early enough to visit the Fair.

STIMULI FOR INDUSTRY

Industry will secure definite benefits from the Chancellor's Budget proposals. The pending removal of the excess profits levy, which was after all intended only as a temporary measure, will be particularly welcomed. About half of the income tax saving will benefit industry and the restoration of the initial allowances in respect of capital expenditure may encourage essential investment. Although the Chancellor is to some extent banking on continued industrial expansion he may be said to be fostering such an expansion by reliefs which will have a "psychological" as well as a cash value.

PURCHASE TAX RELIEF

While it will fully appreciate the purchase tax concessions made by Mr. Butler last week the electrical trade will regard them only as a first instalment. The reduction in prices of domestic appliances thus made possible will no doubt do something to stimulate the flagging business, but much more is necessary to make a real impression. It is also a pity that the Chancellor did not take the opportunity of getting rid of the unfair distinction made between certain gas and electrical appliances to the latter's disadvantage. Retailers with large stocks of appliances will be hit by the changes in tax rates but their compensation may come from increased sales. Vehicle makers will welcome the removal of the tax upon electric goods vehicle chassis which should encourage the development of this desirable form of transport.

REJECTED TENDER

It was announced in December that the English Electric Export & Trading Co., Ltd., had submitted a tender for hydro-electric generators and transformers for the Chief Joseph (Washington) Dam at a price substantially lower than American concerns quoted. It then looked as though the English Electric would secure the contract but as the American elections had just resulted in a change of administration the decision was left to the new Secretary for Defence. That decision, it now seems certain, is the virtual rejection of the English bid. This is not in consonance with President Eisenhower's expressed desire to substitute "trade" for "aid," a view shared by some prominent Americans and conceivably by the American public which will have to pay a larger bill.

COLLIERY ELECTRIFICATION

Increased mechanization of the mines, including the development of new ways of applying electricity, need not mean anything like a comparable increase in the cost of power. In a progress report contributed to the I.E.E. *Proceedings* (Part 2) for March, Mr. B. L. Metcalf shows that half of the 6 per cent of the total coal raised which is now used at the collieries themselves could be saved, mainly by eliminating old steam engine drives. The saving would be enough to provide upwards of 6,000 million kWh per annum by modern generating plant.

COLOUR BLINDNESS

Ability to distinguish between colours is of especial importance in work that involves the colour coding of cables. In the *British Medical Journal*, Professor W. D. Wright (Imperial College) urges that tests for colour blindness should be regularly carried out at school to avoid the waste of time that now occurs in training boys for work for which they are later found unsuitable because of this defect.

Britain Ready for Export Drive

By LESLIE GAMAGE, M.C., M.A.
President, Institute of Export

Electrical Manufacturers Able to Meet All Demands

THE electrical industry is Britain's second greatest export industry and has always been among the leaders in world export. The importance of this fact, with all its implications and responsibilities, cannot be too strongly emphasized. Its achievement at a time of insatiable demands for electrical equipment from our own industries and homes and the equally pressing needs of our overseas customers (not to mention the rearmament programme) is one of the most outstanding examples of modern industrial enterprise. Allowing for price increases, British electrical exports are now three times the pre-war volume and, during 1952, reached a record figure of £218,000,000.

As our friends overseas probably know, this remarkable success has not been unattended by many difficulties; in fact, our overseas customers have had at times some reason to complain of long delivery quotations and even, I am sorry to say, longer execution of orders. But in the main our difficulties, which were the direct result of a complete change from wartime to peacetime production, a process which takes years to complete, have been met with patience and understanding by our friends, with the result that to-day the industry is powerful, flourishing and, *on its own merit*, able to meet all demands and fair competition from any quarter.

In the modern world, however, industry has to meet many problems, some of the most important of which are outside its own control, and particularly at the present time a number of factors have developed, which, unless countered by appropriate action, could have serious consequences. I would therefore like to deal in this short article with the more important of these problems and to outline the policy of the electrical industry to help in overcoming them. I use the word "help" advisedly, because international trade and politics are now so inextricably mixed that the natural operation of the former is no longer possible. It is of the utmost importance that our overseas friends should understand these problems, for on their proper understanding depends the future welfare of all.

The three chief problems which to-day beset all industries including our own are: (1) Foreign competition, often heavily subsidized. (2) Trading restrictions between nations. (3) Lack of finance.

Foreign Competition

There is now no doubt whatsoever of the volume and fierceness of foreign competition. A glance at the following table will show that Japan has trebled the value of her electrical exports over the past three years while Germany has multiplied her trade twelve times in the same period.

Total Electrical Exports
(Million pounds)

	1949	1950	1951	1952
Japan	£2·6	£2·8	£5·3	£8·6*
Germany ..	£7·1	£26·2	£56·3	£85·0*
United Kingdom	£140·0	£158·0	£189·0	£218·0

*Estimated.

The loss of the China markets has induced Japan to push into India and

Pakistan. The Iron Curtain surrounding Eastern Europe has sent German exporters not only to Latin America but to British Commonwealth countries. Germany and indeed many European countries are now offering their industries " incentives " for exports which enable the exporter to reduce his prices. The introduction of these subsidies, in my view, is strongly to be deprecated and eventually only acts to the detriment of all concerned by reducing prices to a false level. Added to the subsidies are further incentives to the customer in extended terms of payment, the Germans being particularly active in this field.

Restrictions and Lack of Finance

It is presumed by many people that it is only necessary to remove from the electrical industry the loads entailed in the production of equipment for armaments and home requirements to secure unlimited orders for capital goods overseas. This is a false assessment. In actual fact the difficulties now encountered in exporting capital goods are becoming as great as those confronting consumer goods. With consumer goods we are up against import restrictions and increasing local manufacture: with capital goods the main barrier is one of finance. Many countries have overspent their resources, while others, having realized that they cannot develop an undeveloped country in a few years, have cut their programmes. While, therefore, the demand for capital goods will continue, its volume must needs be less. It is certain that industrial countries such as our own will soon be scouring the world for orders for this class of equipment and the demand for consumer goods will become more and more limited to those high quality products for which Britain is famous.

Unfortunately, the ravages of war have left our country and others with inadequate financial resources, with the result that developing countries have been compelled to look, too often I fear, to the United States for finance. A great improvement in our financial situation has taken place during the last year, however, and this, coupled with an even greater export effort, should give us a chance to play our full part in world development.

The supply of raw materials generally has improved out of all recognition compared with the position a year ago. British steel production is increasing by leaps and bounds and even the price of copper is inclined to move downwards. As an illustration of our economic difficulties and our need for exports and still more exports: before the war it was possible to pay for a ton of copper by exporting two radio sets. We now have to export eight radio sets to buy the same amount of copper.

Extended Manufacturing Facilities

These, then, are the main problems we have to face. They are very sketchily described in the space at my disposal and, of course, there are many others. How shall we overcome or by-pass them? Fortunately, although they appear, and indeed are, formidable we have in our possession an equally formidable array of weapons.

With foreign competition, for example; I find that British manufacturers are taking it very seriously but facing it with confidence. During the post-war years British industry has been extending its manufacturing facilities by spending vast sums of money on new factories and new plant. In spite of high taxation we have continued to modernize our production equipment by applying resources which in justice to our shareholders we might well have distributed as dividends. In the " tailor-made " equipment of capital plant the skill of our workers still gives us a great advantage over our competitors. This skill has enabled the electrical industry to penetrate even into the economic fastnesses of the United States. Both in consumer goods and capital goods our electrical industry challenges comparison with all countries and is ready to meet all reasonable competition.

The question of " incentives " for exports and extended terms of payment is a sticky subject which I cannot deal with here in any detail except to say that strong representations are being made at high levels to persuade offending countries to abolish such schemes and, of course, it may become necessary to combat them in other ways. As regards extended terms of payment I welcome the steps which our Government is taking to give British industry a chance to meet this problem on level terms with our foreign competitors.

Britain as a World Market

There is one most important point, however, which I would like to emphasize to all

our friends overseas, especially to those in whose countries import restrictions are playing havoc with our trade. The British market still offers the widest field in the world for a great variety of imports. Britain is still the greatest buyer. May I ask, then, that when our foreign competitors offer their goods at cut subsidized prices, it will be remembered that British manufacturers are entitled to expect that those who want to sell their products to Britain will do their utmost to buy from Britain. There is a lot of truth in the old adage "If thou wilt not buy, neither canst thou sell"—a truth which is being realized at long last by many of the leading people in the United States.

Better Deliveries

As a result of the extended manufacturing facilities now available and in full operation, and in view of the decreased world demand both for consumer and capital goods, it will henceforth be possible to give our customers fully competitive deliveries of equipment. The days of over-full order books are gone and delivery quotations for equipment which not so long ago were of the order of years can now be executed in as many weeks. Indeed, most electrical consumer products and many small capital products, e.g., standard motors, small transformers, etc., can be delivered from stock. The boast of our foreign competitors that they "sold deliveries" is now no longer valid. It is significant, I think, that where our competitors have found that they could beat us on deliveries, they immediately pushed their prices up to and even above our level.

Quality

All through the years of the war and the difficult times which followed it, with all the shortages of materials which came in its train, we have maintained the quality of our products up to and even beyond the pre-war standard. During the past few years I have travelled in many parts of the world and everywhere I have heard general praise for British-made goods. We know only too well—we have been long enough at the game—that a satisfied customer remains a customer. It would be suicide for us to reduce our standard of quality: rather, we are taking all steps to increase it.

Allied with quality is the ability and willingness to supply the right sort of equipment properly adapted to or designed for local requirements. In this respect great strides have been made by scientific market research, by attention to design and appearance and by close collaboration with our customers. The days of "take it or leave it" have long gone for ever and it is now the common thing for British engineers and designers to visit overseas markets to study their technical requirements and their individual tastes and preferences.

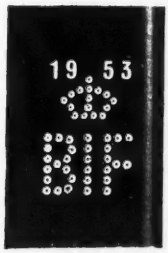
Service

It is a fact that no sterling country obtains less than half of its new capital goods from Britain; many buy as much as three-quarters. It is therefore essential, not only for this class of product but for consumer goods as well, to provide adequate servicing facilities. In this respect Britain has no equal in all her established markets and her electrical industry is particularly well equipped with overseas service facilities.

In all the Commonwealth countries, the Sterling Area, and even in non-sterling areas the industry is represented in the larger towns by offices and showrooms staffed with fully qualified men, many of whom have been trained in the works of the firm they represent. Their job is to give service; to see that the customer is satisfied and remains satisfied; to help him in formulating his requirements; to show and demonstrate his firm's products; and last, but by no means least, to keep his own firm up-to-date upon changes in demand, trends in design and any other matters affecting his area.

For the next two weeks British industry stands on view at the British Industries Fair in Birmingham and London. It stands there proud of its achievements and proud of the quality of its goods. Not all our industries are represented, as many of them, notably the motor car industry, the aircraft industry and the radio industry, already have their own exhibitions which are known the world over. Here, however, at the B.I.F. there is displayed a vast range of the products of British industry—products which I am certain will satisfy in all respects the most discriminating overseas buyer. We shall welcome him even more warmly this year—the year of the Coronation of our young Queen, a year in which we believe we are entering a new Elizabethan era of free enterprise and high endeavour.

British Industries Fair



Stand-by-Stand Guide to the Electrical Exhibits

OVER four hundred and fifty manufacturers will have exhibits of especial electrical interest at the British Industries Fair which from next Monday, 27th April, until Friday week, 8th May, will be held at Castle Bromwich, Birmingham, and at Olympia and Earls Court, London.

Nearly four hundred of the electrical and allied exhibits will be at Birmingham and in the main cover the heavier engineering products, though some of the domestic appliances, lighting fittings, instruments, installation accessories, etc., are also to be found there. In London there are special sections at Earls Court for vacuum cleaners and floor polishers and also for plastic materials and mouldings, while, in addition to a varied selection of lighting fittings and shades, the displays at Olympia include such items as electric clocks, electro-medical apparatus and instruments.

Almost half of the electrical exhibits at Birmingham are in the Electrical Section (C), the remainder being distributed around the other three sections: Hardware (A), Building (B) and Engineering (D). As usual the *Electrical Review* will have a stand centrally situated in the Electrical Section, close to the Exhibitors' Guild. Staff representatives from all departments will be in attendance to assist visitors in every way possible, not only in answering queries about the electrical exhibits, but also in supplying information on all matters appertaining to the electrical industry. The telephone number of the stand is Fair 533.

In addition to this service the *Electrical Review* has again compiled a full list of exhibitors of electrical and allied products, complete with addresses, stand numbers and plan of the whole exhibition. In collaboration with the B.I.F. Electrical Exhibitors' Committee, this list has been combined with a considerable amount of other useful information to form a guide for the use both of visitors and stand attendants. Copies are available free from the *Electrical Review* stand.

This year the "Electrical Day" on which the various electrical organizations pay their official visits to Castle Bromwich is on the second Tuesday, 5th May. The dates on which visits are to be paid to the Fair by Royalty and other important persons and organizations have not yet been definitely announced.

Trade buyers are admitted to all sections of the Fair every week-day from 9.30 a.m. to 6 p.m. except on the last day, Friday, 8th May, when the closing hour will be 4 p.m. Buyers from overseas can obtain admission badges free. Home buyers can for 5s obtain badges which admit them to all sections of the Fair throughout its duration: single-day admission is 2s 6d for each section. The public is admitted daily after 2 p.m. and all day on Saturday, 2nd May, for 2s 6d. On the Saturday organized parties of twenty or more will be admitted for 1s 6d per head.

Special restaurant car trains will run each day from London to Castle Bromwich, leaving Euston at 8.45 a.m. (third class) and 8.55 a.m. (first class), returning at 6.15 p.m. and 6.45 p.m. respectively. On 8th May a combined first and third class train will depart from Euston at 8.55 a.m. and return at 4.15 p.m. A special daily air service leaves London (Croydon) at 9.45 a.m. and returns at 5 p.m. The journey takes an hour each way, the return fare being £5 18s.

EXHIBITS AT BIRMINGHAM

A.E.R. (1938), Ltd., 196, Great Cambridge Rd., Enfield. **D.159.**—Specialized industrial finishes include high vacuum metal coatings for both scientific and decorative purposes, and also electroplating on zinc base diecastings and aluminium fabrications.

Accles & Shelvoke, Ltd., Talford Street Works, Birmingham. **D.323.**—A new "Acvoke" cable spiking gun.

Acme Wringers, Ltd., David St., Glasgow. **A.415.**—Power operated wringers.

Acru Electric Tool Manufacturing Co., Ltd., Chapel St., Stockport Rd., Levenshulme, Manchester, 19. **D.105.**—A new engineers' square for testing the angles between finished plane surfaces enables the angular error to be read directly in thousandths per ft from an incorporated dial gauge.

Aeraspray Manufacturing Co., Ltd., Thimble Mill Lane, Birmingham, 7. **D.734.**—Stationary and portable compressors, spray guns, water wash spray booths, etc.

Aerograph Co., Ltd., London, S.E.26. **D.509.**—Spraying plant, compressors, etc.

Aeronautical & General Instruments, Ltd., Purley Way, Croydon. **D.121.**—See Neville's (Liverpool), Ltd.

Aerox, Ltd., 423, Hillington Rd., Glasgow, S.W.2. **D.439.**—Porous ceramic media for electrolysis, filtration, etc.

Air Industrial Developments, Ltd., Aidspray Works, Shenstone, near Lichfield. **D.134.**—Automatic and semi-automatic compressors, spray guns and booths, etc.

Air Maze, Ltd., Church St., Warrington. **D.646.**—Electrostatic precipitators, air and oil filtration plant, etc.

Airscrew Co. & Jicwood, Ltd., Weybridge. **D.726.**—New centrifugal fans can be seen with a standard range of axial flow units.

Aiton & Co., Ltd., Derby. **D.608.**—A steam pipe in austenitic steel for the new British Electricity Authority power station at Drakelow is designed for operation at 1,500 lb/sq in and 1,060 deg F. A section of a steam receiver shows the anti-corrosion fatigue device now fitted. Also on show are examples of steel and cast iron pipework, steel pipe joints, etc.

Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, 9. **D.536.**—In addition to small tools, special tool steels, and steel castings for traction motors, etc., there is a special display of permanent magnets for scientific instruments, meters, electric clock mechanisms, etc.

Allspeeds, Ltd., Accrington. **D.257.**—Working models explain the action of the Kopp speed variator (illus. p. 905) available from ¼ to 6 h.p. Both mechanical and electrical remote control units are exhibited, the extreme accuracy and sensitivity of speed change being demonstrated by stroboscopes. All units have a range of 9 : 1.

Amplec, Ltd., Grange Lane, Accrington. **C.303.**—A selection of 8 and 10 gal electric washboilers covers both standard galvanized and vitreous porcelain enamelled models. The new combination tax-free model boiler, with hinged 14in wringer and table top, and the "Amplewash" cabinet model are of special interest.

Anglow Electrical Appliances, Ltd., 241-243, Heigham St., Norwich. **C.223.**—Fires, boiling rings and heating elements.

Associated Technical Manufacturers, Ltd., Vincent Works, New Islington, Manchester, 4. **C.111.**—Among connector wire, flexibles, electronic leads, television cables, "V" and "VS" sleevings is a special display of bi-colour wires and house wiring cables being manufactured to new dimensions. The new VO grade of p.v.c. insulation also shown is stable and flexible at temperatures between 150 deg C and −35 deg C.

Astral Equipment, Ltd., 96, Buchanan St., Glasgow, C.1. **C.108.**—Built-in and table model 1½ cu ft absorption type refrigerators.

Auto Diesels (Uxbridge), Ltd., Cowley Mill Rd., Uxbridge. **Outdoor 1229.**—New products include three electrically driven pumps in ¾in, 1¼in and 2in sizes. The 2in unit is designed for high pressure working and operates on heads up to 120ft. Of special interest among petrol and diesel engine driven electric generating sets from 120 W to 60 kW are a new 500 W light-weight portable petrol engine driven alternator of unit construction, and a 25 kVA equipment (illus. p. 903) incorporating the new Ford industrial diesel engine.

C. R. Averill, Ltd., Alyn Mills, Caergwrle, Wrexham. **C.202.**—"Avarc" graphite specialities include lubricating graphites, pipe joint compound, greases, and special graphites for various electrical purposes.

W. & T. Avery, Ltd., Soho Foundry, Birmingham, 40. **D.523/420.**—Weighing, testing and dynamic balancing machines.

B.B. Chemical Co., Ltd., Ulverscroft Rd., Leicester. **D.535/432.**—"Bostik" industrial adhesives.

B.I.F. Engineering Co. (1940), Ltd., 212, Ashton Rd., Birmingham, 6. **A.622.**—Air compressors, spray painting equipment, etc.

B.I.P. Engineering, Ltd., Aldridge Rd., Streetly, Staffs. **D.322.**—Hydraulic presses for the plastics moulding and other industries have automatic control.

B.I.P. Tools, Ltd., 147, Tyburn Rd., Birmingham, 24. **C.319.**—Induction heating equipment for moulds and platens.

B.K.B. Electric Motors, Ltd., 132, Icknield St., Birmingham, 18. **C.608.**—Motors are available from fractional h.p. to 7½ h.p. sizes, a.c. and d.c., and generators up to 18 kW. Flange mounted a.c. and d.c. machines, motor generator and motor alternator sets, rotary convertors, high speed motors up to 10,000 r.p.m., instrument motors, motor reduction gear units, sewing machine motors and foot controls, and small transformers for telecommunications are supplied and special types are built to customers' requirements.

B.T.R.-Silvertown Group, Herga House, Vincent Square, London, S.W. **D.615.**—See British Tyre & Rubber Co., Ltd.

Bakelite, Ltd., 12-18, Grosvenor Gardens, London, S.W.1. **C.404.**—Surrounding a group of Bakelite phenolic and urea resins and moulding materials, laminated sheet, rod and tube, and "Vibak" thermoplastic compounds for extrusion and injection moulding, is a selection of finished articles, including several electrical items. A new group of polyester resins can be used for embedding delicate components such as "miniaturized" radio circuits. Three separate grades of "Bakelite Laminated," combining heat resistance, mechanical strength and maintenance of electrical properties at high temperatures, are finding important uses in electronics and elsewhere. Rubber is being used as a filler to modify phenolic and polystyrene materials for improved shock resistance.

H. J. Baldwin & Co., Ltd., 132, Arkwright St., Nottingham. **C.516.**—Underground and overhead distribution equipment comprises link disconnecting boxes, feeder pillars, pole mounting boxes and overhead line equipment. For the protection of buried cable there is a complete range of interlocking protection covers and stoneware conduits and troughing. Special prominence is given to "Wireohms" elements (illus. p. 934). "Thermat" electric blankets, which are of the open weave type, are non-thermostatic, thereby eliminating radio and television interference.

Bank Hardware Manufacturing Co., Ltd., Pleck Rd., Walsall. **A.325.**—Irons, table lamps and standard lamps.

Barries Electrical Agencies, Ltd., King St., Brighton. **C.102.**—Several new "Dexray" lighting fittings accompany an extended range of switchgear.

Bastian & Allen, Ltd., Ferndale Terrace, Harrow. **C.711.**—An electrode steam boiler illustrates a new simplified arrangement of control with all condensate returned. A standard steam boiler is in use with more elaborate controls. An electrode water boiler (illus. p. 917) suitable for space heating is shown with thermal storage plant. A 20 kW steam jet cleaner can be used both for general cleaning and for degreasing and paint stripping. The "Vapor Phase" unit for high temperature cooling and waste heat recovery from internal combustion engines doubles their thermal efficiency. A special heater shown is suitable for high pressure and high temperature oil heating.

Bayliss, Jones & Bayliss, Ltd., Victoria Works, Wolverhampton. **Outdoor 1325/1224.**—Telegraph ironwork, transmission line equipment, railway fastenings, etc.

Bell's Asbestos Engineering, Ltd., Bestobell Works, Slough. **D.511/408.**—Thermal insulation, packings, jointings, etc.

Belmos Co., Ltd., Bellshill, Lanarkshire. **C.233/112.**—Air-break switchgear and automatic motor control gear cover both industrial and flameproof applications up to 650 V. The industrial exhibits include metalclad switchboards (illus. p. 911) and group motor control boards in single, double and triple tier formation, and contactors from 30 to 450 A rating with a variety of instrumentation and control arrangements. Control pillars for single- or multi-motor control include direct-on, resistance and auto-transformer starters. A two-unit flameproof switchboard comprises a circuit breaker distribution unit of 200 A rating and A.S.T.A. tested to 7.5 MVA, together with a motor starting unit of 75 A capacity. A new 30 A flameproof direct-on starter can be assembled in switchboard formation in single or double tiers.

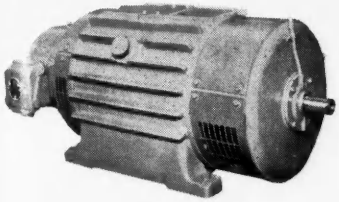
Bendix Home Appliances, Ltd., Albion Works, Kingsbury Rd., Birmingham, 24. **D.303/202.**—Bendix washing machines wash, triple rinse and damp dry automatically.

Benrath Machine Tools, Ltd., Empress St., Manchester, 16. **C.319.**—Static balancing machines.

James Beresford & Son, Ltd., Stork Works, Marston Green, Birmingham, 33. **C.405.**—A comprehensive range of centrifugal pumps includes the company's submersible electric pump (illus. p. 903) claimed to be now employed in over 85 per cent of the boreholes in this country, the "Beresford-Stork" self-priming single stage pump, and various multistage pumps covering outputs from 115 to 50,000 gal/hr and heads from 10 to 1,000 ft. Contractors' pumps, suds pumps for machine tools and liquid circulation, and sump pumps are special purpose units.

Lewis Berger (Great Britain), Ltd., Berkeley Square, London, W.1. **B.621/518.**—Industrial paints and finishes.

Berry's Electric, Ltd., Touchbutton House, Newman St., London, W.1. **C.507/406.**—In the new "Raydair" low-temperature radiator (illus. p. 933) rearward radiation has been eliminated and all the heat from both



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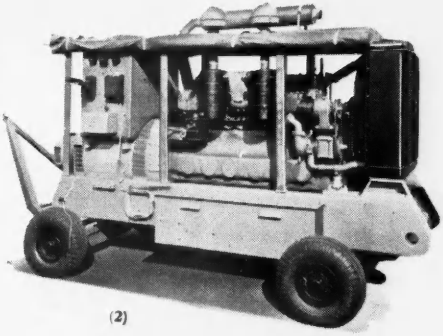

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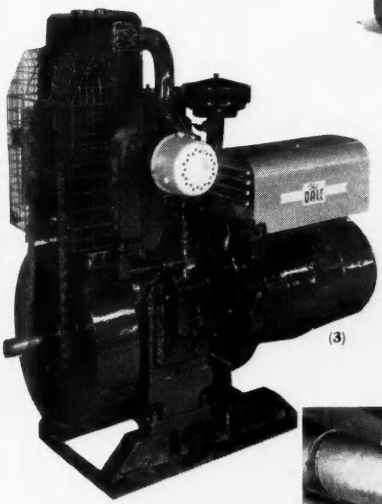

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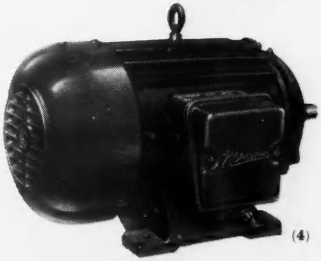

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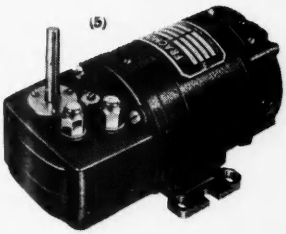

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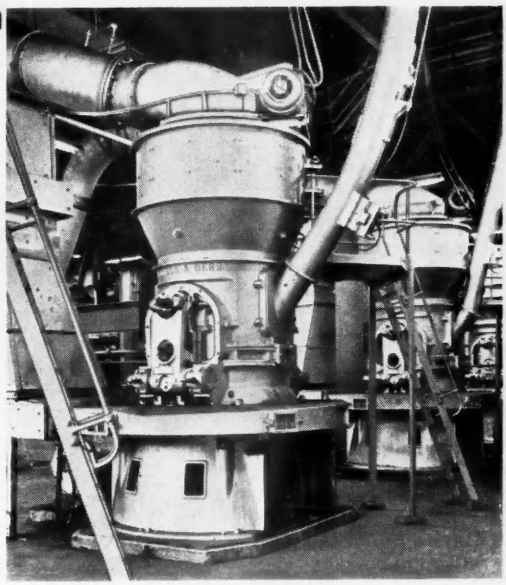

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(1) B.T.H. 6·25 kVA close regulation alternator. (2) Houchin 100 kVA mobile diesel alternator set. (3) Dale Electric fully automatic "Monobloc" generating unit. (4) Newman motor to B.S. CN (ELE) 6814. (5) Fractional H.P. Motors geared unit. (6) International Combustion "Lopulco" mill of the type used in power stations

front and back surfaces of the heating element is carried forward into the room. It is equipped with a thermostat and pilot light. "Magicoal" and "Berrylog" fires include large Jacobean, Georgian, Regency and other period models, two new fires being shown. New period and contemporary lighting fittings are made in glass, wood, fabric, wrought iron and other metals. The "New Look" waterheater, flush fitting with concealed fixings, is now available in two sizes and four finishes. The industrial side is represented by "Viking" fuse-switches, switchboards and accessories.

F. H. Biddle, Ltd., 52, Clerkenwell Close, London, E.C.1. **B.330.**—New items of heating, cooling and air conditioning equipment are the "Dehumidifier" (illus. p. 931), which has a walnut case and in the case of a.c. models, a semi-hermetically sealed compressor; the "75" ¾-ton self-contained air conditioner; and a truck cooler.

Birmingham Battery & Metal Co., Ltd., Selly Oak, Birmingham, 29. **D.514.**—Brass, copper and phosphor bronze tubes, sheets, etc.

Birmingham Welding Co., Ltd., Chester St., Birmingham, 6. **D.533.**—Switchgear and fusegear castings, etc.

Black & Decker, Ltd., Harmondsworth. **C.607.**—A new 6in standard bench grinder has a ¼ h.p. motor, full ball bearing construction and a new type of centrifugal switch, a 6in grinding wheel and 6in wire wheel brush being provided as standard equipment. The new 8in "Ripsnorter" can be used on timber, cast iron, brick, corrugated iron, asbestos, ceramics, etc., the depth of cut being adjustable up to 2 13/16in and angle cuttings up to 45 deg. The new No. 44 orbital sander (illus. p. 925) weighs only 5½ lb and is claimed to be the lowest priced tool of its kind on the market. Other tools in the range include ¼in and ½in drills, a 5in sander-polisher and a 6in saw.

Blaw Knox, Ltd., London, S.W.3. **Outdoor 1303/1202.**—Earth moving equipment, concrete mixers and pumps, etc.

Blending Machine Co., Ltd., Bond St., Birmingham, 19. **C.605.**—Magnetic separators and filters.

Bolton Gate Co., Ltd., Waterloo St., Bolton. **B.302.**—Electrically operated shutter, overhead and armourplate glass doors with pushbutton and photocell control.

Thomas Bolton & Sons, Ltd., Mersey Copper Works, Widnes. **D.518.**—Of special interest among products for electrical purposes are stranded conductors; trolley wire and cellular conductors; "Combarloy" and h.c. copper commutator segments; rotor and stator end rings; rail bonds for electric traction; equalizer bars; busbars; cable sockets, connectors, feeder clamps, etc., for overhead lines; switchgear parts; battery connections; controller fingers; contact tips, etc.

N. Bosson & Co., Cromartie House, Bielgrave Rd., Longton, Stoke-on-Trent. **C.107.**—Electric kilns.

Fredk. Braby & Co., Ltd., 352-364, Euston Rd., London, N.W.1. **B.517/416.**—On a stand constructed of "Bar-Form" metal partitions is a display of perforated metals, ducting, etc.

Bradley & Turton, Ltd., Kidderminster. **D.237.**—A 350 ton self-contained downstroking press equipped with automatic time cycle control is the main item of plant for the plastics industry.

Geo. Bray & Co., Ltd., Leicester Place, Blackman Lane, Leeds, 2. **C.519/418.**—This display comprises a wide variety of embedded electric heating elements, repetition machine work and electroceramics. The combination of embedded metalclad ring, strip, pad, cartridge and "Tubalox" sheathed wire elements manufactured make it possible for the company to tackle almost any medium temperature electric heating problems. Application of heating elements to such products as water heaters, air heaters, vulcanizers, train radiators, etc., is indicated. The Bray car engine heater can be seen in various modified forms.

S. N. Bridges & Co., Ltd., Bridges Place, Parson Green Lane, London, S.W.6. **C.504.**—A new series of ¼in, ⅜in and ½in portable drills (illus. p. 925) is accompanied by routers, surfacers, nibblers, polishers and orbital, disc and belt sanders.

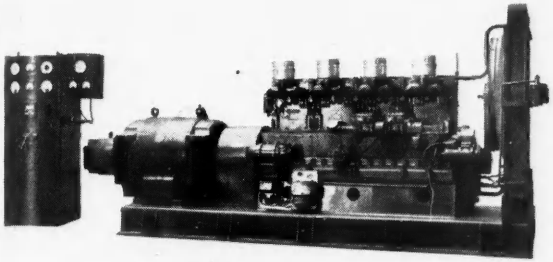
British Electrical Development Association, 2, Savoy Hill, London, W.C.2. **C.509/408.** — Higher productivity is the theme of this stand which has been arranged in co-operation with the Midlands Electricity Board. Sections demonstrate specialized applications of electricity to industry: in the tool room, in forming, cutting and grinding, inspection and measurement.

British Ermeto Corporation, Ltd., Beacon Works, Hargrave Rd., Maidenhead. **D.723.**—Pipe couplings and valves.

British Geon, Ltd., 21, St. James's Square, London, S.W.1. **C.415/314.**—Technical advice is available on the properties and processing of p.v.c.

British Industrial Plastics, Ltd., 1, Argyll St., London, W.1. **C.415/314.**—Moulding materials, urea and melamine resins, adhesives, etc.

British Insulated Callender's Cables, Ltd., Norfolk House, Norfolk St., London, W.C.2. **C.513.**—Among cables and accessories particular emphasis is placed on aluminium as a conductor and cable sheathing material. Examples include LT aluminium sheathed, and LT lead sheathed cables with aluminium conductors; high voltage cables including aluminium sheathed oil filled, and aluminium sheathed IP cables; aluminium sheathed



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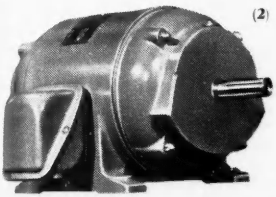
(1) Hampson 140 kVA diesel driven alternator with switchgear cubicle and swinging arm synchronizing panel. (2) Brook drip-proof motor. (3) E.C.C. d.c. motor built in 1883. (4) Auto-Diesel 25 kVA diesel generating set. (5) Beresford 58 stage 4in unit submersible pump. (6) Largest and smallest types of Morrison pumps, 1/3 h.p. and 100 h.p.



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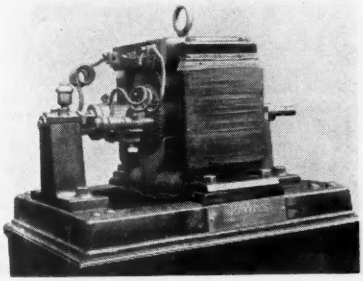

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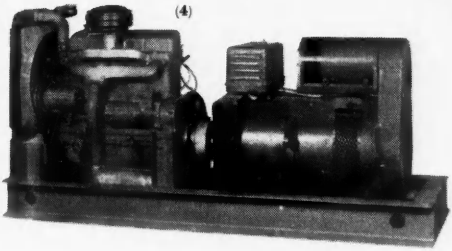

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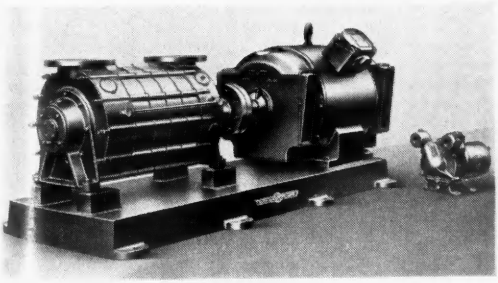


(6)

conductors for overhead lines; jointing aluminium conductor cables with standard cable accessories; mass-impregnated non-draining cables; screened trailing cables; and light weight colliery telephone cables. Also on view are bolted flameproof couplers, industrial power capacitors; copper busbars, copper and aluminium sheets and sections; winding wires; and "Bicaloy" electrodes for electric resistance welding.

British Jeffrey-Diamond, Ltd., Stennard Works, Wakefield. **D.528.**—The new intermediate "Atomill" fine grinder, which is of particular interest to the chemical and plastics industries, can be completely and speedily dismantled, cleaned and re-assembled without the use of spanners. It has a product range from 50 to minus 300 B.S. mesh. Other exhibits are a "Flextooth" crusher, a single roll breaker, a swing hammer pulverizer, an "Atomill" fine grinder and a "Microid Atomill."

British LaBour Pump Co., Ltd., Blundell St., London, N.7. **D.339.**—In an exhibit of self-priming and flooded suction centrifugal pumps for the chemical and allied industries is demonstrated a type "G" vertical packingless pump which incorporates a hydraulic seal to give complete sealing while in operation.

British Manufactured Bearings Co., Ltd., Crawley. **D.137.**—Precision miniature ball bearings are shown with bore diameters from 1mm to 3/16in. An electronic machine permits grading of the balls automatically within five millionths of an inch.

British Moulded Plastics, Ltd., Avenue Works, Walthamstow Av., London, E.4. **C.614.**—A joint exhibit with Moulded Products, Ltd., comprises moulded plastics articles and plastics extrusions for the electrical trade. Of particular interest are a large television cabinet made from phenol-formaldehyde and refrigerator trays and containers injection moulded from polystyrene.

British Non-Ferrous Metals Federation, 132, Hagley Rd., Birmingham, 16. **D.219.**—This stand is arranged as an inquiry bureau.

British Oxygen Co., Ltd., Bridgewater House, Cleveland Row, London, S.W.1. **D.200/100.**—The "Argonaut" automatic welding process, which employs an inert gas shielded arc with a consumable electrode, has great scope for all-position welding on heavy gauge aluminium plate and light alloys. It can also be used on stainless steel and copper base alloys.

British Plastics Federation, 47-48, Piccadilly, London, W.1. **C.415/314.**—An inquiry bureau for the plastics industry.

British Resin Products, Ltd., 21, St. James's Sq., London, S.W.1. **C.415/314.**—Moulding materials and adhesives.

British Thomson-Houston Co., Ltd., Rugby. **C.511/410.**—Working demonstrations are given of an 11 kV 250 MVA switchgear unit for power station and industrial service, a new design of alternator with close voltage regulation (illus. p. 901), "Stacreep" crane control, an "Emotrol" (electronic motor control) panel for a hosiery knitting machine drive, a high-speed electronic batch counter for measuring and cutting lengths of paper tape, stator and rotor units running at 60,000 r.p.m., and sectioned motors running under their own power. Other products represented are fractional h.p. motors, thrustors, industrial heating equipment, high-speed d.c. circuit breakers, new d.c. contactors, and a new 16mm projector. Special attention is drawn to a scale model of a 400 h.p. diesel-electric shunting locomotive and a large diorama of the B.T.H. main drives totalling some 28,000 h.p. for the Abbey Works of the Steel Company of Wales. Apart from special lighting effects, there is a display of "Mazda" lighting for domestic, commercial and industrial applications.

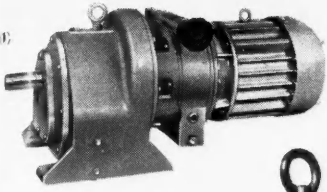
British Trane Co., Ltd., 52, Clerkenwell Close, London, E.C.1. **B.330.**—See F. H. Biddle, Ltd.

British Tyre & Rubber Co., Ltd., Herga House, Vincent Square, London, S.W.1. **D.615.**—Products of the B.T.R.-Silvertown group comprise conveyor and elevator belts, V-belts, anti-vibration mountings, industrial gloves for the electrical industry, and rubber-covered rolls for electrolytic tinning.

British Vacuum Cleaner & Engineering Co., Ltd., Goblin Works, Leatherhead. **C.224 & D.203/102.**—On stand C.224 in exhibited a range of domestic appliances comprising "Goblin" washing machines, cylindrical and upright bag cleaners, including the new "Regal" de luxe model (illus. p. 933) incorporating a power driven brush, heat controlled irons, and three models of the "Teasmade" tea making sets. Industrial vacuum cleaners on stand D.203/102 include portable, central fixed, and chimney sweeping models. B.V.C. Industrial Constructions, Ltd., a subsidiary company, give advice on pneumatic conveying systems and equipment for cleaning flues and the removal of dust and ash in power stations, etc. Hydraulic ash sluicing and disposal systems are also supplied by this company.

Broadwall Engineering Co., Ltd., Beco Works, Kent House Lane, Beckenham. **C.710.**—A new variable output boiler feed pump is provided with a variable speed drive so that the evaporation of the boiler can be balanced. A 2in self-priming pump is another new item.

Brook Motors, Ltd., Huddersfield. **C.304.**—Over the past three years this company's a.c. motors and control gear have been entirely redesigned to meet the increased competitive pressure from the Continent. Protected motors are now available conforming



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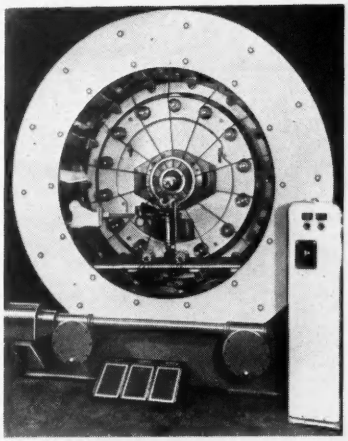

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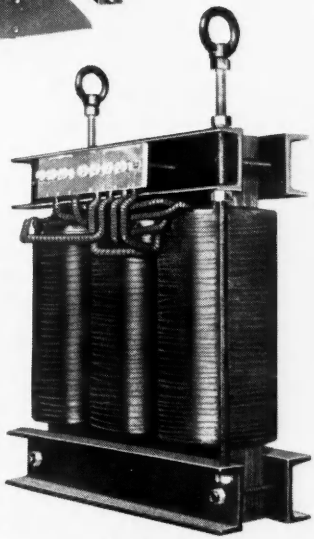

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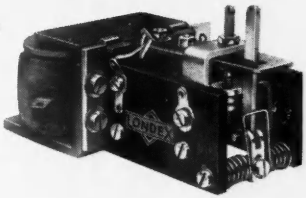

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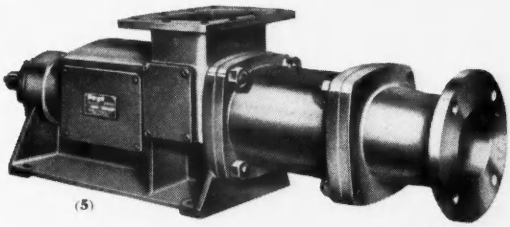
(1) Allspeeds Kopp speed variator. (2) Lucas shuttle winding machine. (3) Cayson 440/480 V to 240/220 V 3-phase 16·5 kVA transformer. (4) Londex super sensitive latching relay. (5) DM12 Mono pump for handling dry materials. (6) Godwin J3D jet pump with direct coupled motor. (7) Hillman "Speedmor" industrial sewing machine motor



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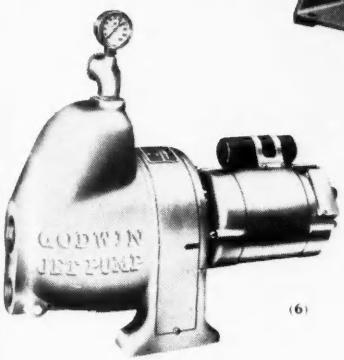

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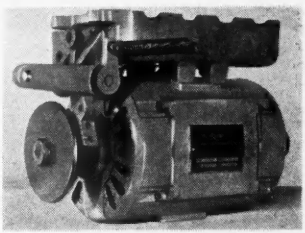

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to the B.S.I. Draft Specification C.N. (ELE) 6814 (illus. p. 903). A totally enclosed fan cooled range also to this draft specification will follow shortly. Additional types of fractional h.p. motors, with frame dimensions based on the American N.E.M.A. frames, give alternative outputs of $\frac{1}{6}$, $\frac{1}{4}$ & $\frac{3}{4}$ h.p. single phase, and approximately double in the three phase rating. A new hand operated star-delta drum type starter for motors up to 15 h.p. is entirely formed from moulded and pressed parts with silver contacts in a die-cast case. Prototypes of other new switchgear developments can also be seen.

J. & F. Brooks, Ltd., 50-54, Shudehill, Manchester, 4. **A.633.** — Table and floor standards.

Alfred Bullows & Sons, Ltd., Long St., Walsall. **D.743/642.**—The only moving parts of the new " Hydrovane " rotary compressor (illus. p. 923) are a slotted " Meehanite " rotor and a number of alloy cast iron vanes. Both portable and stationary units are in operation. The type PR. 303E spray plants have 1/3 h.p. motors and weigh only 42 lb. An automatic traversing spray gun demonstrates the efficiency of a 10ft wide water wash booth.

Bulpitt & Sons, Ltd., Swansea Works, Birmingham, 1. **C.506.**—The removal of restrictions on the use of copper enables the company to exhibit for the home market a wide range of " Swan Brand " kettles in capacities from 2 to 6 pints, with standard or rapid loadings and alternative finishes. The new " Dorchester " coffee percolator (illus. p. 931) in polished aluminium is shown with the " Waldorf " fire redesigned to latest British Standards and safety requirements. Other " Swan Brand " appliances include heat-controlled irons, toasters, urns, steam cookers, wash boilers, glue pots, blankets, heating pads, elements and immersion heaters. Ground base aluminium hollow-ware completes the display.

George Burn, Ltd., Rabone Lane, Smethwick. **B.309/208.**—Electrical conduit.

Bylock Electric, Ltd., South St., Enfield. **C.217.**—The new 532 model floor polisher (illus. p. 933) is among a display of upright, cylindrical and hand type vacuum cleaners; hedge trimmers; spray units; spray guns; industrial blowers; hair dryers and stands; hand dryers; and irons.

C.A.V., Ltd., Acton, London, W.3. **C.501.**—Electrical equipment for commercial, industrial and passenger vehicles include generators and engine starters, generator control boards, switchboards and switch panels, batteries, direction indicators and lamps.

C.E.A. (Distribution), Ltd., 1-3, West Av., Clarendon Park, Leicester. **C.204.**—A new dual freeze cabinet (illus. p. 933) gives 3 cu ft of deep freeze and 3 cu ft of normal freeze. Other new designs are a 12½ cu ft servi cabinet, a deep freeze storage locker, displ and storage cabinets for frozen food, a " Servall " refrigerated food counters.

C.M.I. Products, Ltd., 8, New Colle Parade, Finchley Rd., London, N.W. **D.163.**—Industrial vacuum cleaners.

C.S.A. Industries, Ltd., Avon Work Wharf St., Warwick. **B.605/504.**—In number of typical and original kitchens a installed " English Rose " and " Warwick kitchen equipment including specially styl electric refrigerators and cookers.

Cable Covers, Ltd., St. Stephen's Hous Westminster, London, S.W.1. **C.237.**— Overhead line tools and equipment include th new C.C.L. stay rod, which completel eliminates splicing, is quick to erect, and save 9-12in of stay wire with each rod erected.

Cable Makers' Association, 287, Hi Holborn, London, W.C.1. **C.216.**—This st is the rendezvous of the seventeen associa companies. Models and pictures of instal tions in which C.M.A. cables are used depic the new Ellerman liner *City of Port Elizabeth* an electric locomotive with overhead cables, the latest " Canberra," television at the Oval during a cricket match, a destroyer and a aircraft carrier.

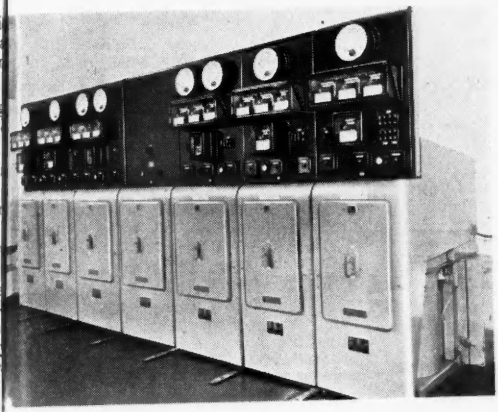
Campbell Engineering Co., Ltd., Sherman Works, Bromley, Kent. **A.238.**—The latest adaptation of the " Hotway " rapid water heater is a shower unit (illus. p. 934). Immersion heaters with withdrawable type elements are available in both automatic and non automatic types.

W. Canning & Co., Ltd., Great Hampton St., Birmingham, 18. **D.207/108 & D.209/110.**—Two model plating plants represent a great number of plants made between 1924 and 1939, and an ultra modern version incorporating both bright nickel and chrome plating processes. Among actual equipment shown are filter units, plating barrels, a typical automatic plating plant control unit, "Lacomatic" centrifugal lacquering machines (illus. p. 913), a 20in dia 8-spindle automatic polishing machine, a centreless polishing machine, a rotary finishing barrel, resistance boards and rectifiers.

Capon Heaton & Co., Ltd., Hazelwell Mills, Birmingham, 30. **D.712.**—Mechanical mouldings, extrusions and bondings for the electrical industry.

Tom Carrington & Co., Ltd., Lyndon Tool Works, Stony Lane, West Bromwich. **D.6[illegible]22.**—Among thread taps, chaser type screwing stocks and dies is a portable power screwing machine.

Carter & Co. (Nelson), Ltd., William St., Nelson. **C.203.**—Sirens from ⅛ h.p. to 10 h.p. include a small " whizzer " type siren for fire



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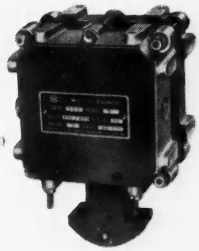

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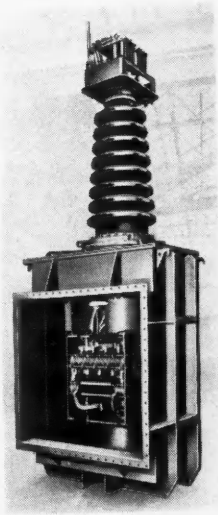

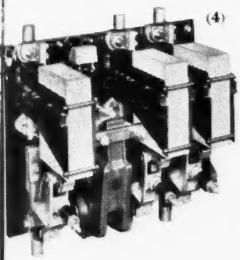

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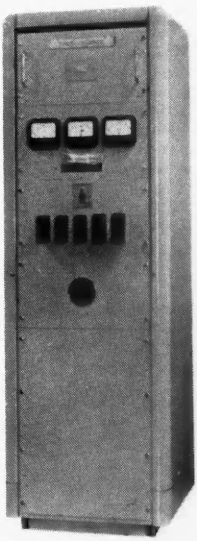

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(1) Yorkshire Switchgear seven-panel l.v. metalclad switchboard. (2) Westool series 700 solenoid. (3) Metrovick single-phase on-load tap changer type H. (4) Donovan 600 A triple pole contactor. (5) Westinghouse 3 kW "Transbooster." (6) Ferranti high speed oscillograph. (7) Ether solenoid operated valve

engines, ambulances, etc. The range of unit heaters, with loadings from 3 kW to 15 kW for offices, greenhouses, drying, etc., has been augmented by the addition of a new heater (1, 2 or 3 kW) available in both floor-standing and inset types.

Cayson Electrics, Ltd., 139, Queens Rd., Watford. **C.121.**—Open, enclosed, air-cooled and oil insulated transformers from 25 VA to 50 kVA (illus. p. 905) include types for l.v. lighting, mains conversion, soil-heating, battery charging, arc furnaces, hair-waving machines, portable hand tools, and laboratory use. Also displayed are metal rectifying equipment and compound filled fluorescent lighting chokes and ballast units.

Chance Brothers, Ltd., Birmingham, 40. **B.309/208.**—Marine and aviation lighting equipment, generating plant, switchgear, submersible pumps and glass for the laboratory, science and industry.

Chandos Engineering Co., Ltd., 17, High St., Egham. **D.757.**—Infra-red ovens, rotary dryers, etc.

Chilton Electric Products, Ltd., Hungerford, Berks. **C.606.**—Both the "Buk" and "Kub" shavers are now available with variable voltage control. A transformer-adaptor and a new universal shaver socket are suitable both for shavers and for travelling irons. Many new features and adaptations of h.r.c. circuit breakers and earth leakage trips are available.

Chloride Batteries, Ltd., Clifton Junction, Swinton, Manchester. **C.301.**—The design of "Exide-Ironclad" and "Exide" batteries (illus. p. 925) has been modified by the development of "Porvic," the new microporous plastic separator material, and new corrosion resistant lead alloys. The "Exide KHV" heavy duty commercial vehicle battery and the "Silver Exide" standard car battery are displayed for the first time. "Keepalite" automatic emergency lighting systems are represented by a typical charging/control cubicle, with its associated batteries.

Christy & Norris, Ltd., Chelmsford. **D.403.**—Disintegrators, "Briton" grinders (illus. p. 925), pulverizers and laboratory grinders are products of this company.

Clang, Ltd., Crown Yard, London, N.W.2. **C.210.**—With electrical accessories for domestic and commercial installation are samples of electrical aircraft components. A new ceiling switch, a dimmer switch and an ejector plug are of special interest.

Clegg & Coupe, Ltd., Molesworth St., Rochdale. **C.220.**—The "Prefect" domestic electric washing machine (illus. p. 931) is available with a heating unit incorporated. It has a dry wash capacity of 5/6 lb. The power wringer, which is detachable and can be locked in any of five positions, has a safety release on the cover.

Clyde Fuel Systems, Ltd., 68-74, Queen Elizabeth Av., Glasgow, S.W.2. **C.215.**—Automatic controls for oil and coal burning plant.

Cochran & Co., Annan, Ltd., Annan. **D.435.**—Boilers.

E. K. Cole, Ltd., Southend-on-Sea. **C.415/314.**—Injection, compression and extrusion mouldings include refrigerator components, relay switches and grilles for loudspeakers, etc.

J. Collis & Sons, Ltd., Regent Sq., Gray's Inn Rd., London, W.C.1. **D.625/524.**—The new "VertiVeyor" (illus. p. 929) is a sectionalized form of finger tray elevator, in this instance fitted with an automatic interruptor mechanism, to ensure synchronized feed, and automatic discharge grid. A new "Loada Veyor" has a hardwood slat carrying medium. With all types of "RolaVeyor" are the "MotaVeyor" (light and medium types), the "SlatVeyor" and "Power-RolaVeyor." Electric-hydraulic trucks and stackers are also on view.

Colour Sprays, Ltd., 64, Heath St., Hampstead, London, N.W.3. **B.500.**—Spraying equipment includes spray pens and guns for glass and plastic silvering, acid base fluids, and steam. Both stationary and portable air compressor plants are shown together with air filter sets, reducing valves and a fume extraction unit.

Columbus-Dixon, Ltd., Capitol Works, Empire Way, Wembley. **B.716 & C.619.**—On stand C.619 twenty Columbus and Dixon floor cleaning and maintenance machines include three new units: a power floor scraper; an automatic cable winder which can be used with any type of machine; and an improved 24in power floor dryer and squeegee (illus. p. 933), which incorporates a combined scrubbing and drying hand attachment enabling floors to be scrubbed and dried under low machines, benches and tables, etc. The Dixon power float shown on stand B.716 makes possible the laying of cement and granolithic floors of great strength, which will not dust or craze, at a speed several times faster than by traditional methods.

Concentric Manufacturing Co., Ltd., Tyburn Rd., Birmingham, 24. **D.222.**—Among this company's products are the "Streamline" automatic pie and tart moulding and filling machines; a bread slicing machine, with wrapping and sealing unit (illus. p. 929); a cutlery washing, sterilizing and drying machine; the "Lofstrand" glass washing, sterilizing and drying machine; and the "Tealarm" automatic tea-making apparatus.

Concordia Electric Wire & Cable Co., Ltd., Long Eaton. **C.740.**—Products include

wires cables and flexibles insulated with enamel, cotton, silk, rayon, nylon, paper, glass, asbestos, rubber, plastic materials, lacquer, varnished cambric, etc.; resistance wires, bare and insulated: cord assemblies; and insulating varnishes.

Connollys (Blackley), Ltd., Blackley, Manchester. **C.216.**—See Cable Makers' Association.

Constructors, Ltd., Tyburn Rd., Erdington, Birmingham, 24. **C.401/300.**—The main exhibit consists of a storage installation of shelving built three floors high, complete with flooring, staircases and handrailing.

Controlled Heat & Air, Ltd., Cornwall Rd., Birmingham, 40. **C.727/628.**—See Incandescent Heat Co., Ltd.

Conveyancer Fork Trucks, Ltd., Liverpool Rd., Warrington. **D.717/616.**—The fork truck model E2-20 (illus. p. 929) is a 3 wheel battery electric model specially designed to manœuvre in narrow aisles between factory process points and other confined spaces. Fitted with a special low stacking mast, it can operate inside a rail van where headroom is limited. It has a load lifting capacity of 2,000 lb at 20in load centre, and can stack its loads to heights up to 12ft. In place of the normal forks it can be fitted with a crane, hydraulic squeeze clamp, boom shovel or rotating head.

Co-operative Wholesale Society, Ltd., National Works, Hall St., Dudley. **B.711/620.**—Washing machines, vacuum cleaners, irons (illus. p. 931), hair dryers, kettles, fires, boiler rings and fluorescent lighting fittings are electrical products.

Copper Development Association, Kendals Hall, Radlett. **D.232.**—By means of photographs and display examples the Association invites users of copper and copper alloys to make full use of its services. Books on applications of copper in many industries are prominently displayed.

Copperad, Ltd., Colnbrook, Bucks. **B.721.**—In addition to unit heaters for electric, steam or hot water operation there is a range of fan coolers (illus. p. 933) working from a central supply of chilled water or brine.

R. H. Corbett & Co., Ltd., Hydrum Works, Burgess Hill. **Outdoor 1355/1254.**—The new "Hydruped" fork lift truck (illus. p. 929) handling 1,000 lb is made in the standard type to lift up to 10ft. Pedal traction reduces the overall weight and increases the manœuvrability. Lifting and steering are battery-operated. The "Hydrum" high-stacker, designed primarily for use in narrow alleyways and for loads up to 3 cwt, stacks goods into shelves up to 12ft high. A third new equipment is the Bickerstaff brick fork.

Coventry Gauge & Tool Co., Ltd., Coventry. **C.319.**—"Matrix" floating carriage diameter measuring instruments are accompanied by "Micro-Maag" internal micrometers.

Coventry Motor & Sundries Co., Ltd., Spon End, Coventry. **C.415/314.**—This display comprises thermo-setting mouldings for the electrical industry, and also extrusions in thermo-plastic materials.

Coventry Refrigerator Co., Ltd., Northfield Rd., Coventry. **C.215.**—Condensing units of both open and hermetically sealed types for all types of refrigeration equipment.

Craigpark Electric Cable Co., Ltd., Flemington St., Springburn, Glasgow. **C.216.**—See Cable Makers' Association.

Crompton Parkinson, Ltd., Crompton House, Aldwych, London, W.C.2. **C.216.**—See Cable Makers' Association.

R. Cruickshank, Ltd., Camden St., Birmingham. **D.226.**—A display of plating and polishing plant includes polishing mops, compositions, brushes, etc. A new item is a multi-oblique plating barrel with four baskets, with an individual drive for each basket. The company's two centrifuges have been modified and the "Senior" plating barrel is now arranged for two-speed operation. Standard production models include a 36in by 22in burnishing barrel, a "Junior" plating barrel and a copper plating and filtration unit.

Crystalate, Ltd., Mill Lane, Tonbridge. **C.415/314.**—The exhibit of Crystalate, Ltd., Ebonestos Industries, Ltd., and Mica Products, Ltd., comprises component parts, accessories and assemblies in moulded plastics; synthetic resin bonded paper tubes and bobbins; stampings and fabrications in laminated and other plastics and mica.

D. P. Battery Co., Ltd., Bakewell. **C.713.**—The "Kathanode" range of traction cells (illus. p. 925) shown are all of the latest pattern. Recent development are the introduction of "Porvic" ribbed separators and special insulating rods which fill the spaces between the separators at the edges of each negative plate, so preventing short circuits arising from the formation of spongy growth. Special "Kathanode" cells for marine duties and diesel engine starting on railway locomotives can be seen, with open and sealed Planté cells.

Dale Electric (Yorkshire), Ltd., Electricity Buildings, Filey. **Outdoor 1336.**—New fully automatic "Monobloc" diesel driven lighting units, in which the alternators are bolted directly to the engine frame with the switchboards mounted on top, start when the first light or appliance is switched on and stop when the last is switched off. The alternators, complete with switchboards, can be removed from the engines in a few minutes.

They are made in 3 kVA (illus. p. 901) and 6 kVA sizes, arranged if desired for remote control. A 28 kVA alternator is driven by a new David Brown 6-cylinder engine.

Darwins, Ltd., Tinsley, Sheffield, 9. **D.225/126.**—Permanent magnets are cast or forged in the latest materials for television components, thermostats, etc. Special steels, castings and wire rods are also represented.

Davis & Timmins, Ltd., Billet Rd., London, E.17. **C.316.**—Screws, nuts, washers, terminals, cable sockets, connectors, conduit bushes, etc.

Dawson, McDonald & Dawson, Compton Works, Ashbourne. **C.718.**—A range of spraying equipment meets general industrial and specialized requirements in the laundry and dry cleaning trades. A dampening attachment for an electric iron has recently been introduced.

G. P. Dennis, Ltd., Fleming Rd., Speke, Liverpool. **C.610.**—Of special interest is a cubicle switchboard incorporating back-of-panel mounted heavy duty h.r.c. fused switches. These fused switches, from 60 to 800 A capacity, can be built up into cubicles with flush fronts, the price being only slightly higher than that of similar open industrial types. The cubicles can be supplied in various colour schemes to meet customers' requirements. The company's latest cast iron feeder pillars (illus. p. 913) house a standard l.v. substation switchboard in which the combined fuse and switch units are interchangeable with the units provided for the switchboards in the normal brick built indoor substation. Switch-fuses, distribution boards and consumers' units are other new items on view.

Desoutter Bros., Ltd., The Hyde, Hendon, London, N.W.9. **C.412.**—Four new two-speed portable heavy duty electric drills of 5/8in and 1/2in capacity (illus. p. 923) are fitted with $\frac{1}{3}$ h.p. motors of new design, giving exceptional performance and incorporating radio suppressors. Fourteen electric drill guns and screw guns include 1/4in and 5/16in units with speeds from 450 to 5,000 r.p.m. and there are three corner drills and two telescopic jig drills. A full range of pneumatic tools is also on view.

Dexray Engineering Co., Ltd., King St., Brighton, 1. **C.101.**—A complete range of switchgear includes switchfuses of the h.r.c. and rewirable types; fuseboards, both wood and metal cased; isolator switches; splitters; busbar chambers; and fuse units. Special attention is drawn to a new house service unit.

Diamond Motors (Wolverhampton), Ltd., Upper Villiers St., Wolverhampton. **C.229.**—The "Graiseley" pedestrian controlled electric vehicle has applications in factories, stores, hospitals, etc.

Diesel Equipment, Ltd., Cowley Mill Rd., Uxbridge, Middlesex. **C.728.**—Of particular interest among diesel generating and welding sets are the new 40 kVA "Albion-D.E.L." set, a 5.5 kVA fully automatic generating set, suitable for farm and domestic lighting; and a 300 A single operator mobile welding set (illus. p. 919).

Dimplex, Ltd., Totton, nr. Southampton. **C.715.**—The new "Coronation" model (illus. p. 931) oil filled radiator, measuring 48¾in long by 22½ in high (including feet) is particularly suitable for installation under low windows. Dimplex flameproof type radiators have been Buxton approved for installation in gaseous atmospheres Groups II and III.

Dohm, Ltd., 167, Victoria St., London, S.W.1. **D.159.**—Crushing, grinding, mixing and drying plant.

Donovan Electrical Co., Ltd., 70-82, Granville St., Birmingham, 1. **C.417.**—In addition to switch and fuse gear, and motor control gear and accessories, this exhibit includes a new range of 2 to 8 pole small power relays. Among contactors, from 15 to 1,000 A, is a new improved 600 A triple pole unit (illus. p. 907). A special feature is made of the "Runtact" power duct for feeding travelling hoists or portable tools from overhead runways, and there is a demonstration of the quick stopping of a.c. motors by plugging, or by d.c. injection.

Doulton & Co., Ltd., Doulton House, Albert Embankment, London, S.E.1. **D.302.**—Porous ceramics are widely used for filtration, diffusion, electrolysis (see illustration on page 934) and other processes.

Dunlop Rubber Co., Ltd., Cambridge St., Manchester. **D.623/522.**—Ebonite, separators, conveyor belting, etc.

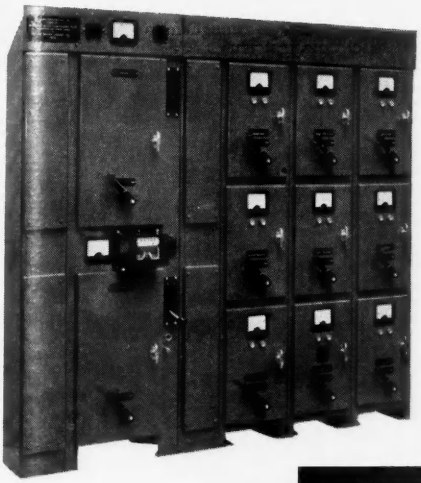
Dunlop Special Products, Ltd., Fort Dunlop, Birmingham. **D.623/522.**—Anti-vibration mountings, flexible transmission couplings and other precision rubber products.

E.M.B. Co., Ltd., Moor St., West Bromwich. **D.505.**—In addition to compressed air equipment comprising cylinders, speed controls and valves for presses, die casting and injection moulding machines, this exhibit includes a.c. contactors from 30 A to 300 A ratings (illus. p. 911) for a.c. or d.c. operation.

Easiclene Porcelain-Enamel (1938) Ltd., Darlaston. **B.522.**—A 4½ cu ft absorption-type refrigerator (illus. p. 931) and a washing machine (4-4½ lb dry clothes).

Ebonestos Industries, Ltd., Excelsior Works, Rollins St., Ilderton Rd., London, S.E.15. **C.415/314.**—See Crystalate, Ltd.

Edison Swan Electric Co., Ltd. 155, Charing Cross Rd., London, W.C.2. **C.716.**—See Cable Makers' Association.



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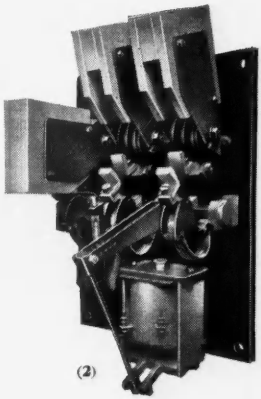

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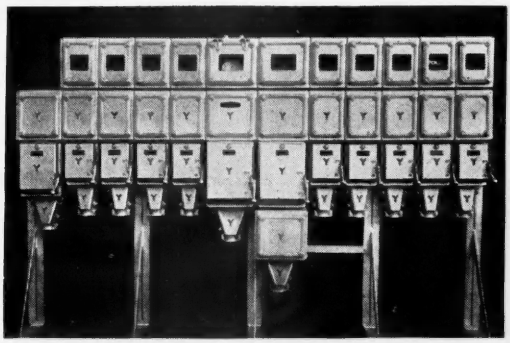

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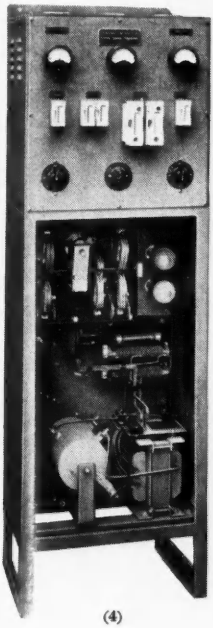

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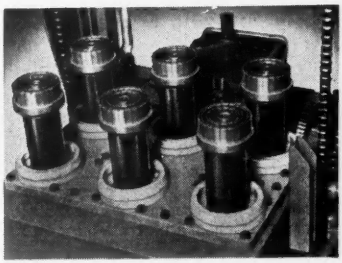

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(1) Typical Belmos switchboard. (2) E.M.B. d.c. operated contactor. (3 Outdoor "Y" fuse switchboard (Electro Mechanical Mfg. Co., Ltd.). (4) Automatic emergency lighting control cubicle (Pritchett & Gold). (5) English Electric A.R.64 single anode h.v. rectifier with mercury pool cathode, suitable for grid control. (6) Top view of an 11 kV circuit breaker showing Tufnol insulators

Electric Construction Co., Ltd., Bushbury Works, Wolverhampton. **C.708.**—Under the theme " E.C.C. in Six Reigns " exhibits comprise a d.c. motor (illus. p. 903) with switch panel made in the 1880's and also a diesel driven 5 kVA continuity alternator set with a special " No-break " feature designed for telecommunications and other essential services. The latter equipment is connected to a teleprinter to demonstrate how the set continues to maintain supplies when the mains are broken. To complete the display there are photographs of plant supplied in the past seventy years.

Electric Depot, Ltd., Pritchett St., Birmingham, 6. **C.725.**—In addition to power cable supports this company shows industrial local lighting fittings, both mains and l.v. patterns of which incorporate improved bases. The " Lens Aid " surgery equipment (illus. p. 934), which provides both visual magnification as well as illumination, is shown for the first time.

Electrical Components, Ltd., Ludgate Hill, Birmingham, 3. **C.714.**—Desk and wall oscillating fans, and marine fans.

Electrical Review, Dorset House, Stamford St., London, S.E.1. **C.616.**—Visitors are invited to use this stand as a meeting place or as an information bureau for all matters relating to the electrical industry. The telephone number is Fair 533.

Electro Chemical Engineering Co., Ltd., Netherby, Queens Rd., Weybridge. **C.611.**—The " Efco-Udylite " fully automatic "Junior" plating machine (illus. p. 917) has an output of 200 sq ft of work per hour. It can be used for bright nickel, chromium, zinc, cadmium or brass plating or for various non-electrolytic processes. A hot air dryer is included. Fully immersed plating barrels and plated samples are also shown.

Electro Mechanical Manufacturing Co., Ltd., Marlborough St., Scarborough. **C.419.**—" Y " type industrial switch and switchfuse gear (illus. p. 911) is designed for either indoor or outdoor service under difficult climatic conditions.

Electromagnets, Ltd., Boxmag Works, Bond St., Birmingham, 19. **C.605.**—An exhibit of particular interest is a large high intensity overband type of magnetic separator (illus. p. 917) salvaging general ferrous scrap from household refuse, and removing general tramp iron from coal, limestone, foundry sand, glass cullet, etc. A high intensity conveyor head unit built into a shortband conveyor gives some three times the separating power of a magnetic pulley or drum of comparable size. A lifting magnet, swarf separator, high intensity chute type magnetic separator and various permanent magnet separators are also shown.

Electronic Computors, Ltd., 1213, Stratford Rd., Birmingham, 28. **D.22.**—Electronic instruments for industrial calculations.

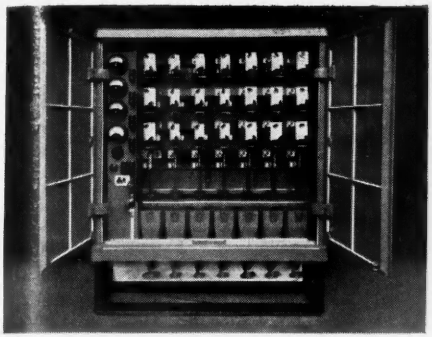
Enfield Cables, Ltd., Victoria House, Southampton Row, London, W.C.1. **C.216.**—See Cable Makers' Association.

English Electric Co., Ltd., Marconi House, Strand, London, W.C.2. **C.613/512.**—Industrial motors include the LY standard range flameproof XLK motors and KKS crane motors, fractional h.p. machines also being represented. An industrial hand-dryer is on view, while among domestic appliances there are cookers, refrigerators, food mixers, plate-warmers and washing machines. The new " Superform " distribution fuseboard and examples of cubicle construction are interesting fusegear exhibits. A F600 switchboard incorporates " OB " air circuit breakers and combination fuse switches. A 15 kVA pole mounting transformer and a 200 kVA sub-station transformer, complete with cable boxes, are products of the Transformer Department. The Mining Department shows a miniature depth indicator for use with a geared a.c. winder with twin motors, each rated at 1,980 h.p. The rectifier exhibits include the single anode glass tube mercury pool rectifiers, known as " excitrons " (illus. p. 911), in two types, for high and low voltage respectively. Separate panels display meters, relays and instruments.

Ether, Ltd., Tyburn Rd., Birmingham, 24. **C.700.**—Most of the company's new temperature recorders, controllers and indicators are operated electronically. The " Widestrip " electronic potentiometer gives six records on a single chart 10in wide. It is also made as a recording automatic controller to maintain an exact furnace temperature. A potentiometer indicator has a scale 30in long and deflects from zero to full scale in 12 seconds. This instrument is also made as a high-low, multi-point and proportional temperature controller. A full range of Ether-Wheelco electronic indicating controllers is also shown, together with the "Panelmount Capacitrol"; indicators with automatic cold junction compensation, moving coil temperature compensation and other refinements; solenoid operated valves (illus. p. 907) for pressures up to 300 lb/sq in for chemical work and of flameproof construction; radiation, optical, surface, contact and molten metal pyrometers.

Excelall Metal Workers, Ltd., Sampson Road North, Birmingham, 11. **B.404.**—The company's cable sockets are of special interest.

Falk, Stadelmann & Co., Ltd., 91, Farringdon Rd., London, E.C.1. **C.60.**—House service units include a flush cabinet type which houses the meter and cut-out. Among industrial switchgear are new semi-enclosed or



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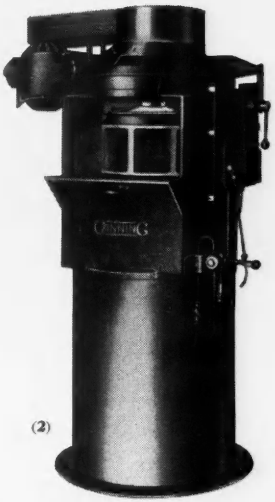

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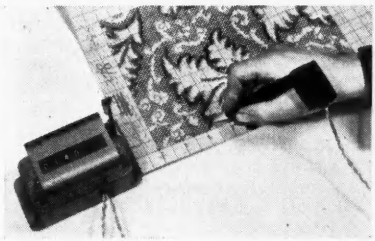

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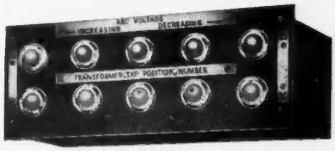

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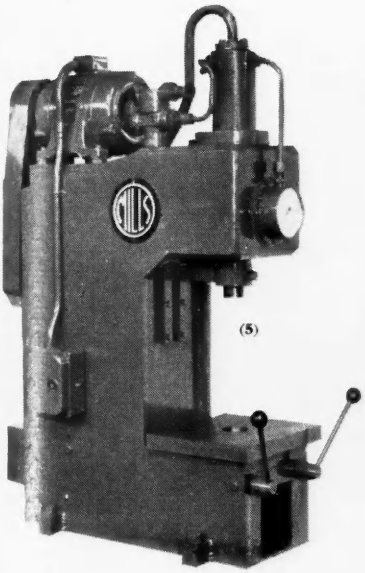

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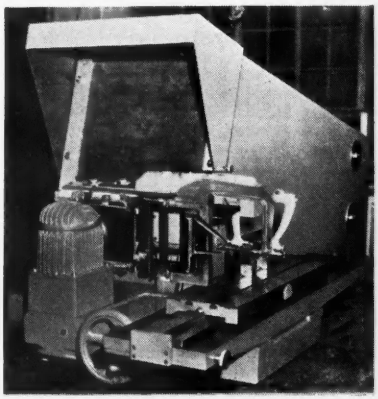

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(1) G. P. Dennis feeder pillar. (2) Canning "Lacomatic" centrifugal lacquering machine. (3) Trumeter "Stylus" counter. (4) Wm. McGeoch indicator panel. (5) Mills "Oilaulic" 6 ton bench press. (6) Hilger turbine blade projector (Alfred Herbert, Ltd.)

h.r.c. interchangeable fuses and h.r.c. standard gear up to 500 A. Two new switches are introduced for surface and flush type wiring systems. " Hitest " cables are fully represented. Industrial lighting fittings include the " Colne " fluorescent fittings and twin blended light units. Commercial lighting fittings comprise shop window units, porcelain, screw-necked type ceiling fittings for use in humid atmospheres; and new contemporary fittings, among which is the " Sirius " pendant fitting (illus. p. 931). There is also a full range of floodlighting and street lighting fittings. Representing domestic appliances are the " Featherlight " iron, the " Gadabout " travelling iron, the " Auto-Perc " coffee maker, an automatic toaster, the " Cleanline " kettle, the " County " log-coal effect fire, " Sunray " and " Economist " reflector fires, the " Electrostrip " paint remover, and the " Mixmaid " portable food mixer.

Felco Hoists, Ltd., 17, Victoria St., Westminster, London, S.W.1. **D.247/146 and Outdoor 1235.**—Electric chain and wire rope hoists are among lifting appliances.

J. H. Fenner & Co., Ltd., Marfleet, Hull. **D.406.**—With Hainsworth variable speed V-belt drives are V-belts with filament rayon cords, " Taper-Lock " pulleys and bushes, and " Fenaplast " p.v.c. flame resistant conveyor belting.

Ferranti, Ltd., Hollinwood, Lancs. **C.615/514.**—Transformers built to British Electricity T.1. Specification comprise units from 5 to 1,000 kVA, the tank of a 50 kVA transformer being cut away and the interior illuminated. A 50 kVA moving coil voltage regulator of feeder pillar construction controls the supply to all exhibits on the stand. A new high speed cathode ray oscillograph (illus. p. 907) can be used to examine and record transient voltages produced by an impulse generator, in the testing of transmission lines and associated gear. With a polyphase meter testing set are maximum demand meters and indicators and a.c. prepayment meters. Of special interest among measuring instruments are clip-on ammeters, the " Tesvac " for vacuum testing, etc., a viscometer, a maximum demand alarm, an electronic digital computer, and a high speed tape reader. The new " Pentland " series of small transformers and chokes meet, at a low cost, the stringent requirements of Interservices Specification R.C.S.214; they are completely hermetically sealed. Among products of the Ferranti foundry are " Nomag," " NoduMag " and spheroidal graphite iron, high duty iron and light repetition castings. Valves and cathode ray tubes, and synthetic resin-bonded paper tubes and cylinders represent other branches of the company's business. Domestic appliances consist of thermal storage heaters, immersion heaters and circulators, fires, space heaters for schools, and clocks.

Fescol, Ltd., North Rd., London, N.7. **D.529.**—The company's electrodeposition process prevents corrosion and wear and makes possible the reclamation of worn components.

Finney Presses, Ltd., New Eagle Engineering Works, Berkley St., Birmingham, 1. **D.241.**—A 15/25 ton hydraulic open-throat press is one of a new range for use in industrial workshops, the largest being 100 tons. A self-contained heat circulating unit (illus. p. 919) for serving the automatic heat control of moulds or platens incorporates a thermostatically controlled 6 kW Santon immersion heater. The immersed type pump unit, which has an 8-12 gal/min capacity at 15ft-5ft head, is operated by a $\frac{1}{8}$ h.p. motor. The new P.D.G. high pressure oil pumps have improved efficiency and accessibility.

Firth Co., Ltd., Warrington. **D.611.**—Electrode and welding wire in coppered and bright drawn finishes is displayed in coil and straight lengths.

Firth-Vickers Stainless Steels, Ltd., Staybrite Works, Weedon St., Sheffield, 9. **D.419/318.**—" Staybrite " stainless, heat and creep-resisting steels in sheet, strip, bar, forgings, centrifugal, centri-die, static and precision castings.

Fisher & Ludlow, Ltd., Kingsbury Rd., Birmingham, 24. **D.303/202/Outdoor 1318.**—" Bendix " automatic washers can be seen in both domestic and commercial types and there is a model layout of a typical Bendix self-service " launderette." A working exhibition of " Flowline " belt conveyors, " Flowlink " overhead chain conveyors and carousel conveyors, and other material handling equipment occupies most of this stand. A new film " The Flowblock Pallet Storage System," is shown in a small cinema.

Flexible Drives (Gilmans), Ltd., 195, High St., Smethwick, 41. **D.506.**—Flexible shaft driven tools are available for drilling, sanding, polishing, grinding, wire brushing, etc.; for tube descaling of all types of boilers, etc.; and for the removal of rust and old paint. The new " Flexmaster " machine (illus. p. 923) which incorporates quickly interchangeable handpieces, has a speed range from 100 to 24,000 r.p.m.

Flinders (Wholesale), Ltd., 14-20, St. Peter's St., Ipswich. **C.714.**—Oscillating fans.

Foster, Yates & Thom, Ltd., Blackburn. **D.504.**—" Rotocube " dry powder mixing machines, comprising cube shaped drums mounted diagonally at a compound angle on trunnions and rotated at approximately 10 r.p.m., ensure a consistently accurate mix of

ingredients varying widely in characteristics and proportions. The "Lancastrian" 50 ton automatic moulding press is a new product.

Foundry Equipment, Ltd., Linslade Works, Leighton Buzzard. **D.301/200.**—Demonstrations are given of a British built F.E. (Sutter) automatic shell moulding machine (illus. p. 917), sand mills and mixers, and the "Junior" automatic electric sand-rammer.

Fractional H.P. Motors, Ltd., West Heath Works, Rookery Way, Hendon, N.W.9. **C.721.**—The comprehensive range of "Fracmo" motors includes series, shunt, single-phase, two- or three-phase, shaded pole and capacitor synchronous motors up to 1/6 h.p.; also geared units (illus. p. 901) having a final speed from 1 to 600 r.p.m. and from 1 to 17 lb/in torque. The company is also displaying its "Sylentflo" hand hairdryers available in ivory and walnut Bakelite finish.

W. & T. French, Ltd., Browning St., Ladywood, Birmingham. **D.347/242.**—Irons, kettles, fires, coffee percolators, soldering irons, etc.

Fulford Brown Brothers (1929), Ltd., Regent Parade, Birmingham, 1. **C.714.**—"Crystex" lighting fittings.

G.W.B. Electric Furnaces, Ltd., Dibdale Works, Dudley. **C.321.**—The scope of the range of "Autolec" electrode steam raisers and water boilers is demonstrated by an 800 kW water heater and a new 15 kW unit. The latter, the smallest of its type ever produced in this country, brings electrode type boilers into an even wider range of application, particularly for small intermittent supplies of heated water for space and process heating. A flow diagram shows the application of an "Autolec" electrode water boiler to a thermal storage system (illus. p. 919).

Gascoignes (Reading), Ltd., Reading. **D.715/614.**—The latest development in milking equipment includes new milking machine power units, the "Mobilette" with the "Auto-Clenza," a tandem two level auto-recorder and twin abreast auto-recorders.

General Electric Co., Ltd., Magnet House, Kingsway, W.C.2. **C.503/402.**—This stand tells the story of lighting, the theme embracing research, development and application. The simplest method of producing the bulb of a filament lamp, namely glass-blowing, is demonstrated, a film showing the new ribbon machine capable of producing one million bulbs a day. A colourful pillar fitted with fluorescent tubes attracts attention to a display of lamps, including "Osram" tungsten lamps, fluorescent tubes, mercury and sodium discharge lamps. A special feature traces the evolution of the lamp from the earliest carbon filament lamp to the coiled coil filament lamp. The story of the discharge lamp is outlined by a working model of a Geissler tube, a demonstration of fluorescence, and models exemplifying the modern discharge lamp as used, for instance, in street lighting. With examples of fluorescent and other industrial lighting fittings, there are enlarged photographs of typical installations. Enlarged colour transparencies of tungsten, sodium, fluorescent and mercury vapour street lighting indicate the suitability of each to a particular situation. Examples of street lighting lanterns include a new post-top lantern housing five 8ft U-shaped cold cathode tubes. A special application of exterior lighting is demonstrated in a section devoted to airport lighting.

Gent & Co., Ltd., Faraday Works, Leicester. **C.407.**—A new industrial bell has an 8in cast metal gong under which all the mechanism is housed. The staff locator transmitter (illus. p. 931) is now separate from the relay cabinet either for standing at the side of a telephone switchboard or for wall mounting. Up to 63 signals can be transmitted by six keys and three coloured lights. A small visual indicator has many applications for offices, etc. Fire alarm equipment, watchman's clocks, marine clocks, liquid level indicating and recording apparatus, luminous call equipment, telephones for internal communication, burglar alarm systems and mine signalling apparatus, including a new face conveyor signalling and motor control pull, are also exhibited. All the clocks throughout the B.I.F. building are driven from a master clock on this stand.

Edward Gill, Ltd., 52-54, Hylton St., Birmingham, 18. **A.644.**—Fires, elements, etc.

D. Gilson & Co., Ltd., Billet Rd., London, E.17. **C.316.**—Terminals, cable sockets, connectors, conduit bushes, etc.

Gittings & Hills, Ltd., Tower Varnish Works, Birmingham, 6. **B.328.**—Industrial finishes.

Glass Developments, Ltd., Sudbourne Rd., Brixton Hill, London, S.W.2. **D.412.**—Special features of the "Ultrasonoscope" ultrasonic flaw detector are a "steerable beam" probe and the facility for using the "Sonoscope" presentation, whereby a picture similar to an X-ray radiograph can be obtained.

W. T. Glover & Co., Ltd., Trafford Park, Manchester, 17. **C.216.**—See Cable Makers' Association.

H. J. Godwin, Ltd., Quenington, Gloucestershire. **D.745 and Outdoor 1306.**—Included among a range of jet pumps and reciprocating pumps for deep and shallow wells is the J3D unit (illus. p. 905) with direct coupled motor for ejector duties.

Graphite Products, Ltd., 52, Battersea Church Rd., London, S.W.11. **D.305/204.**—

"Foliac" graphites, jointing compounds, greases and paints.

Greengate & Irwell Rubber Co., Ltd., Greengate Works, Salford. **C.216.** — See Cable Makers' Association.

Greenwood & Batley, Ltd., Albion Works, Leeds. **D.218.**—Screw making plant comprising cold forging, bolt head trimming and thread rolling machines are working exhibits. The non-flameproof type battery tramming locomotive (illus. p. 927) has a normal drawbar pull of 360 lb (starting 700 lb) provided by a totally enclosed 5 h.p. 48 V motor. It has a 3 speed, drum type, reversing controller.

Guest Keen & Nettlefolds (Midlands), Ltd., Box No. 24, Heath St., Birmingham, 18. **B.309/208, B.629/526 and Outdoor 1325/1224.**—Screws, bolts and nuts, Nettlefolds-Parker-Kalon self-tapping screws and Phillips recessed head screws, railway fastenings and telegraph ironwork are products shown.

Guests Brass Stamping Co., Ltd., Birmingham, 29. **D.732.**—Hot die pressings.

Gulf Oil (Great Britain), Ltd., Minoco Wharf, West Silvertown, London, E.16. **D.534.**—Petroleum products include "Silvertown" transformer, switch and other insulating oils; inhibited turbine oils; oils for time lag control units; meter lubricants; cable impregnants; and busbar, current transformer, cable, etc., sealing compounds. A display of degraded oils shows problems posed; and an "Acitest" unit is designed for giving quick indication of transformer oil condition in service.

H.E.C. Compressors & Engines, Ltd., Levis Works, Birmingham, 9. **D.739/638.**—Air compressors include a number of new electrically operated automatic units both stationary and portable. They operate generally at a maximum pressure of 150 lb/sq in with a displacement of from 2 to 16 cu ft/minute.

Hague & McKenzie, Ltd., Pyramid Works, Sloane St., Birmingham, 1. **C.502.**—The range of "Pyramid" brand utensils, designed specially for use on hotplates, includes over seventy domestic utensils, and over fifty items of heavy duty equipment.

Hale & Hale (Tipton), Ltd., Dudley Port, Tipton. **D.609/508.**—Castings in blackheart malleable iron for overhead power transmission systems, power station equipment and heavy flameproof switchgear.

Hall & Goulding (Bognor), Ltd., Shripney Rd., Bognor Regis. **A.224.**—Universal fireguards for portable fires are made in two sizes. Box type guards fold neatly away.

Hampson Industries, Ltd., Bull Lane, Greets Green, West Bromwich. **D.720 and Outdoor 1233.**—Self-contained petrol and diesel driven generating sets are available from ½ to 350 kVA (illus. p. 903), with fully automatic and remote control if desired. A new self-exciting, self-regulating alternator is on view.

Harding, Rhodes & Co., Ltd., Tower Works, Globe Rd., Leeds, 11. **D.515.**—Electrical counting instruments, tachometers, tachographs, dial recorders, etc.

G. A. Harvey & Co., (London), Ltd., Greenwich Metal Works, London, S.E.7. **B.329.**—Heat exchangers, pressure vessels, "Harco" perforated metals, woven wire cloth and gilled tubes indicate the variety of the company's products.

Harvey, Frost & Co., Ltd., Bishop's Stortford. **D.405/304.**—Vulcanizers.

L. G. Hawkins & Co., Ltd., 30-35, Drury Lane, Kingsway, London, W.C.2. **C.403.**—New lines are the "Tiffee" tea-making apparatus, the 3 gal "Dinky" boiler, the "Elizabethan" kettle, the "Peter Major" heater, and the "Posser-Matic" attachment, which enables a vacuum cleaner and wash boiler to be used for clothes washing.

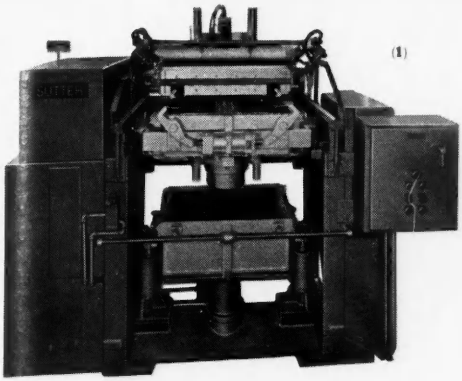
W. T. Henley's Telegraph Works Co., Ltd., 51-53, Hatton Garden, London, E.C.1. **C.216.**—See Cable Makers' Association.

Alfred Herbert, Ltd., Coventry. **D.310 & D.321.**—The "Atritor" dryer-pulverizer for boiler firing, etc., is made in seven sizes with motors from 15 to 140 h.p. Demonstrations are given of new applications of Sigma multi-dimension inspection machines, Hilger projectors, the Solus-Schall crack detector, the Hall micro-hardness tester, the Taylor-Bonson alignment telescope and the Hilger turbine-blade projector (illus. p. 913).

Higgs Motors, Ltd., Birmingham, 6. **C.601.**—With the predominant theme "Individual Motor Drive," exhibits include standard foot, flange mounting and vertical mounting motors in a variety of enclosures. The space-saving stator and rotor unit can be made an integral part of the machine it drives to give up to four definite speeds. A very complete range of variable speed a.c. motors extends to 500 h.p. with variations of up to 10-1 speed ratio. The change-speed motors have multiple windings giving 2, 3 or 4 definite speeds, each maintained constant under varying load conditions. Other exhibits are polishing motors, loom motors and a range of geared motors from ¼ to 30 h.p. A new range of totally-enclosed, fan-cooled motors conform to the draft B.S. CN (ELE) 6814. A self-regulating single-phase a.c. generator operates without the use of an automatic voltage regulator.

Hilger & Watts, Ltd., 98, St. Pancras Way, Camden Rd., London, N.W.1. **D.321.**—See Alfred Herbert, Ltd.

Hillman Electric Motors, Ltd., 2-3, Northwold Buildings, Northwold Rd.,



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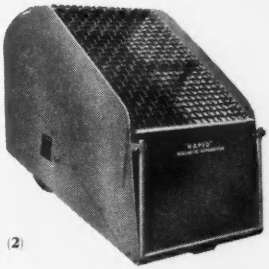

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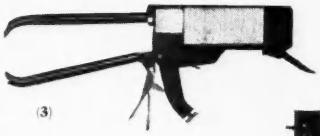
(1) Automatic shell moulding machine (Foundry Equipment, Ltd.). (2) Rapid portable foundry separator. (3) Triangle spot-gun welder. (4) Bastian & Allen 300 kW electrode hot water boiler with automatic load control, giving 1 million B.Th.U./hr. (5) Electromagnets overband type magnetic separator. (6) "Efco-Udylite" automatic "Junior" plating machine (Electro Chemical Engineering Co., Ltd.)



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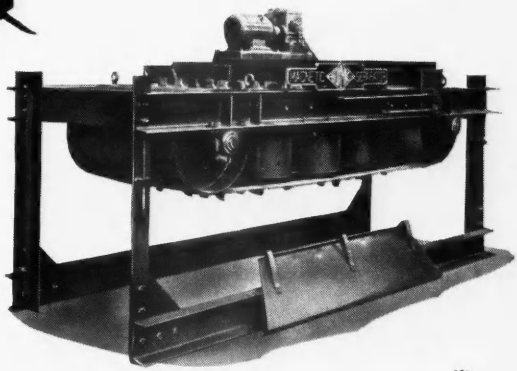

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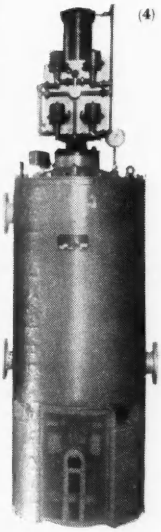

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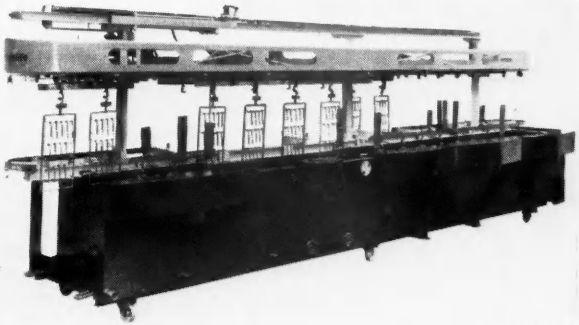


London, N.16. **C.100.**—Among fractional h.p. motors are single drive, low geared and sewing machine units. High frequency stator and rotor units are also on view, together with the new "Speedmor" unit (illus. p. 905) which, incorporating a universal motor, graduated carbon pile speed regulator and friction brake, is suitable for glove-making machines and outdoor workers' sewing machines.

P. F. Hockley, Ltd., 19, Charing Cross Rd., London, W.C.2. **C.602.**—See J. & H. Walter, Ltd.

Holden & Hunt, Ltd., Cox's Lane Works, Old Hill, Staffs. **C.719/620.**—Resistance welding and heating machines, foot operated spot welders (5 to 25 kVA capacity), and a welder fitted with the latest B.T.H. thyratron weld time control are demonstrated. Auto butt wire welders (3, 8 and 15 kVA) can be fitted with hand operated cam clamping or foot operated spring loaded clamping (illus. p. 919). Of particular interest to overseas buyers are four spot welders for the Canadian market.

Holt, Siron & Co., Ltd., Dominion Works, Alfred Rd., Birmingham, 11. **B.406.**—The "Nymph" illuminated shaving mirror (illus. p. 931) is available in two sizes, 10in by 8in and 8in by 6in.

Hoover, Ltd., Perivale. **C.626.**—Besides the company's new washing machine with its increased capacity, larger wringer, automatic pump emptying and wheels for easy movement, there is a new model of the "Glassmaster" glass washing device, which incorporates a valve which prevents the return of used water to the supply pipes and even stronger cleansing jets for dealing with 1,500 glasses an hour. Fractional h.p. motors are available from 1/6 h.p. to ½ h.p. with solid flange or resilient mountings, and auto-belt tensioners if required.

E. C. Hopkins, Ltd., Grosvenor Street West, Birmingham, 16. **D.741.**—Flexible shaft machines, grinders, polishers, etc.

Houchin, Ltd., 447, Grand Buildings, Trafalgar Sq., London, W.C.2. **C.705/604.**—All the alternators and diesel alternator sets shown are of improved design. Special features of a new 93 kW self-contained mobile diesel alternator set (illus. p. 901) are the methods of directly coupling the alternator to the engine flywheel for rigidity and compactness, and the control panel flexibly mounted over the alternator. An 18 kW unit designed to meet small factory loads and lighting, a mobile set for the starting of jet aircraft engines, and 160 kW, 200 kW and 480 kW alternators are further representatives of the company's products.

James Howden & Co., Ltd., 195, Scotland St., Glasgow, C.5. **D.605.**—Auxiliary equipment for generating plant, fans, dust collectors, compressors, etc.

I.T.D., Ltd., 95/99, Ladbroke Grove, London, W.11. **Outdoor 1356.**—Materials handling equipment includes "Stacatruc" and "Aerolift" fork lift trucks, "Electricar" industrial platform trucks, "Portapal" pallet transporters, etc. The new battery-electric "Stacatruc" model 45EH/9 (illus. p. 929) has been specially designed to meet export requirements and to withstand arduous duties in the heavier industries. It has a maximum lift of 9ft and a maximum load capacity of about 4,500 lb.

Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. **D.619 & D.409/308.**—The Plastics Division displays "Mouldrite" thermosetting and thermoplastic moulding powders, end-products demonstrating how these powders are utilized by the engineering, electrical and motor industries. A special feature is made of synthetic resins for use in foundries. The Metals Division shows copper, brass, cupro-nickel, phosphor-bronze and other non-ferrous alloys in plates, sheet, strip, tube, wire, rod and extrusions; and wrought aluminium alloys in similar forms.

Impregnated Diamond Products, Ltd., Tuffley Crescent, Gloucester. **C.319.**—Tools for the cutting, grinding and drilling of hard materials as tungsten carbide, glass, ceramic, refractory, stone, etc.

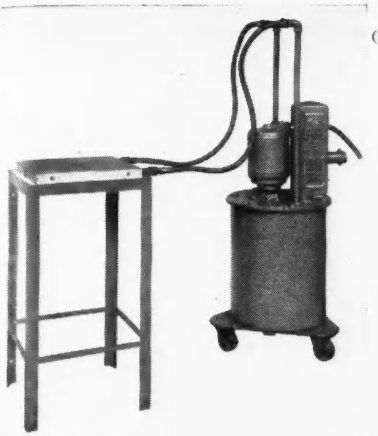
Incandescent Heat Co., Ltd., Cornwall Rd., Birmingham. **C.727/628.**—Covering the products of the associated companies, Metalectric Furnaces, Ltd., Selas Gas & Engineering Co., Ltd., Thompson L'Hospied & Co., Ltd., Controlled Heat & Air, Ltd., and Metal Porcelains, Ltd., are a number of models and photographs. Electric furnaces, which include steel melting and h.f. induction heating units are represented by a model of a 4 ton/hr 1,500 kVA 3-phase arc swing roof tilting furnace for steel melting, etc.

India Rubber, Gutta Percha & Telegraph Works Co., Ltd., Herga House, Vincent Sq., London, S.W.1. **D.615.**—See B.T.R.-Silvertown Group.

Indusmond (Diamond Tools), Ltd., 4 Greville St., Hatton Garden, London, E.C.1. **C.319.**—With polished diamond tools and diamond dressing tools is a complete range of diamond impregnated metal bonded tools including wheels, laps, grinders, reamers, millers, saws and drills.

Industrial Fan & Heater Co., Ltd., Airflo Works, Evelyn Rd., Birmingham, 11. **C.315.**—Fans, fume and dust removal plant, pneumatic conveyors, plenum heating and air conditioning plant.

Industrial Guarding Equipment, Ltd., Mill Works, Alvechurch, Birmingham. **C.16.**—Machinery guards.



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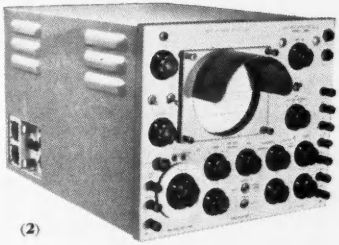

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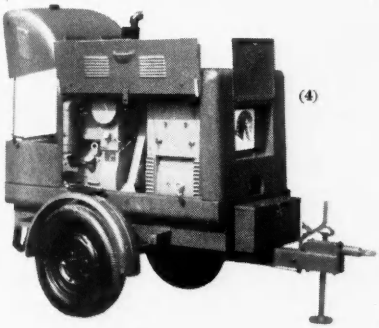

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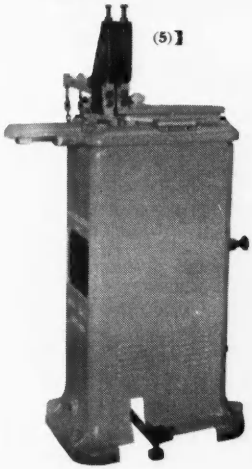

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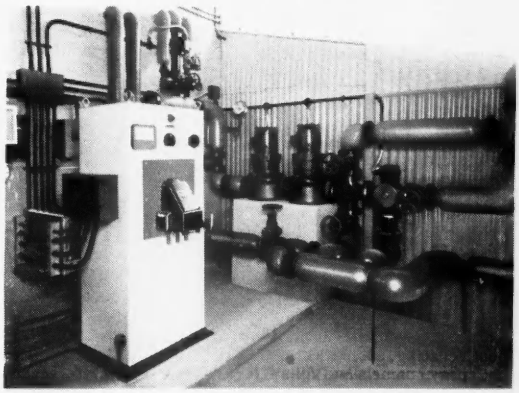


(1) Finney heat circulating unit. (2) Southern Instruments M950 universal oscilloscope. (3) Sciaky P.A.D. type projection welder. (4) Diesel Equipment 300 A mobile welding set. (5) Holden & Hunt No. 2 butt welder. (6) G.W.B. Electric Furnaces 200 kW "Autolec" thermal storage plant

Industrial Pyrometer Co., Ltd., Gooch St., Birmingham, 5. **C.716.**—Demonstrations are given of industrial pyrometers, rotary switches, rotary switch indicators, indicating and recording controllers, magnetic and motor control valves, pressure switches, etc. The "Pyrstat" controlling pyrometer is a new development.

International Combustion, Ltd., 19, Woburn Place, London, W.C.1. **D.617/516.**—A "Lopulco" mill (illus. p. 901) is similar to units being installed at the Drakelow power station, the boiler installation at which is shown by a sectioned model. Another working model demonstrates the effect of pulverized fuel corner burners in a water-tube boiler setting. As part of the display of steam generating equipment there is the "Usco" plate type air heater installed in many generating stations. Other exhibits are a louvre travelling grate stoker; a "Dynocone" machine for dewatering and classifying coal slurries, etc.; a "Vacseal" pump which uses no sealing water; a working model of a gravity bucket conveyor system; and Neckar water softening equipment.

Invicta Electrodes, Ltd., Bilston Lane, Willenhall. **D.717/616.**—Welding machines and electrodes.

Ioco, Ltd., Netherton Works, Anniesland, Glasgow, W.3. **D.701.**—Electrical insulating materials include black adhesive tape.

Ionic Plating Co., Ltd., Grove St., Birmingham, 18. **C.723/624.**—Samples of plating on non-metallic as well as metallic surfaces form the exhibits of this company.

Ipscol, Ltd., Pell St., Reading. **D.617/516.**—Automatic control gear.

J.P. Engineering Co., Ltd., Meynell Rd., Leicester. **A.425**—Electrically driven lawnmowers include 12, 14 and 16in types.

Jackson, Heywood & Co., Ltd., Bury New Rd., Whitefield, near Manchester. **C.612.**—The "Twin-o-Matic" 50 ton hydraulic press incorporates a Fraser "Mono Radial" pump and four 1,600 W thermostatically controlled hotplates.

Jenolite, Ltd., 43, Piazza Chambers, Covent Garden, London, W.C.2. **B.221.**—A new paint stripper removes paint and grease from metal, wood, glass and plastics with equal facility. The Jenolite chemical sealer, an alternative to red lead and other expensive primers, combines particularly with the company's remover.

Jenson & Nicholson, Ltd., 36, St. James's St., London, S.W.1. **B.515/414.**—Industrial finishes are accompanied by the "Liquid Envelope" peelable packaging material, spray booth coating, solventless insulating varnishes, hot spray enamels and fillers.

C. H. Johnson (Machinery), Ltd., Adswood Rd., Stockport. **Outdoor 1337/123.**—The new "Loband" enables the "Hi-loveyor" (illus. p. 927) to be fed by means of end tipping lorries. When handling coal the combination can deal with 180 tons per hour.

Richard Johnson & Nephew, Ltd., Forge Lane, Manchester, 11. **B.417/322.**—Ferrous and non-ferrous wires.

Johnson & Phillips, Ltd., Charlton, London, S.E.7. **C.216.**—See Cable Makers' Association.

Keelavite Rotary Pumps & Motors, Ltd., Aliesley, Coventry. **D.330.**—A comprehensive range of equipment used in the hydraulic transmission of power.

Keith Blackman, Ltd., Mill Mead Rd., Tottenham, London, N.17. **D.755/654.**—A display of "Tornado" fans covers centrifugal fans up to 750 deg F with capacities from 900 to 30,000 cu ft/min, a 60in axial fan impeller, blowing and propeller units, man cooling fans, unit heaters, "Extravent" window fans, axial (ring mounted) fans (illus. p. 933), air circulators and conditioners.

W. Kennedy, Ltd., Station Works, West Drayton, Middlesex. **D.326.**—Strip, bar and tube bending machines include equipment for screwed and split conduit and for alloy conduit, and bench and portable benders for refrigerator work.

Kenwood Electrics, Ltd., Hipley St., Woking. **C.313/212.**—Food mixers, "liquidizers," heat controlled irons and toasters.

Key Engineering Co., Ltd., 4, Queen Victoria St., London, E.C.4. **C.709.**—With "Key" fibre conduit, bends, joints, etc., is a hand tooling lathe demonstrating the cutting of spigot and socket and sleeve joints. A fibre underfloor duct wiring system is included in the floor of the stand, together with working pedestals for both power and telephones.

Lamb, Hingley & Co., Ltd., Lye, Stourbridge. **A.433.**—Of particular interest among galvanized and enamelled hollow-ware is a new electric clothes boiler, comprising a 4 gal galvanized tub with a 2 kW element. A perforated shield both protects the element and provides circulation.

Langley London, Ltd., 72, Borough High St., London, S.E.1. **C.226.**—Mica and plastic laminates for electrical components include a new range of insulating materials.

Lawler, Ayers & Co., Ltd., Broad Street House, 54, Old Broad St., London, E.C.2. **D.104.**—A complete new range of pipe bending machinery incorporates many unique features. Other "Laco" products on show include the super tile cutter and the universal hole cutter.

Legg (Industries), Ltd., Williamson St., Wolverhampton. **C.325.**—Battery charging

equipments (illus. p. 925) are shown for vehicles and trucks and also for garage and industrial uses. Attention is also drawn to air-cooled and oil-immersed transformers and a.c./d.c. low voltage experimental power units for science laboratories.

Lewin Road Sweepers, Ltd., Victoria Works, West Bromwich. **D.405/304.** — Pedestrian controlled electrically driven sweeper-collectors.

Ley's Malleable Castings Co., Ltd., Derby. **D.513/410.**—Castings both in blackheart malleable iron and "Lepaz Pearlitic" malleable iron include many for the electrical industry.

R. A. Lister & Co., Ltd., Dursley, Gloucester. **D.205.**—General purpose power loaders are available in 16ft and 24ft models.

Liverpool Electric Cable Co., Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.717.**—See London Electric Wire Co., & Smiths, Ltd.

Lockers (Engineers), Ltd., Church St., Warrington. **D.520.** — "Locker-Traylor" electric vibrating feeders, conveyors, screeners, bin vibrators, etc.

Londex, Ltd., 207, Anerley Rd., London, S.E.20. **C.722.**—Recent developments in relays (illus. p. 905) include Admiralty approved shockproof contactors, coaxial relays, sensitive mercury switch relays, mercury switch delay relays and high voltage relays. Six process timers are shown, together with photo-electric equipment (which requires no thermionic valves) used for counting articles on a conveyor at a rate of up to five per second. D.c. flashers for zebra crossings, winker beacons for traffic control and fluorescent landing lights represent another side of the company's business. For the control or indication of liquids and gases there are the "Lectralevel" floatless liquid level control, pressure and air flow switches, and the "Flowguard."

London Aluminium Co., Ltd., Westwood Rd., Birmingham, 6. **A.411.**—"Diamond" aluminium utensils for electric cooking.

London Electric Wire Co., & Smiths, Ltd., 24, Queen Anne's Gate, Westminster, London, S.W.1. **C.717.**—This company with its associated companies, Frederick Smith & Co., the Liverpool Electric Cable Co., Ltd., and Vactite Wire Co., Ltd., displays bare and insulated conductors for all electrical purposes. These include the "Lewcos" cotton, silk, paper and enamel products; "Lewmex," "Lewmexglas" and "Lewbestos" insulated wires and strips; copper braids and cords; covered resistance wires; "Glazite" connecting wires; "Anacos" bare copper and copper alloy wires, strips, strand, sections and forgings; power transmission line wires, trolley wires and telegraph and telephone line wires; aerial wire and earth rods; rubber, paper and cambric insulated cables for mines, ships, factories, railways, etc.; underground power cables; domestic flexibles; "Eureka" and "Vacrom" resistance wires and tapes; molybdenum rods, wires and tapes; nickel, iron mandrel, "Vacsteel" and other wires for the lamp, radio valve and cathode ray tube industries.

Longford Engineering Co., Ltd., L.E.C. Factory, Shripney, near Bognor Regis. **C.204.**—Refrigerators.

Joseph Lucas, Ltd., Great King St., Birmingham, 19. **C.501.**—A new 24 V type of the "Freelite" wind-driven lighting set will operate radio sets, vacuum cleaners, butter-making churns, etc. With a working demonstration of a typical layout of a car electrical installation is a display of car and cycle accessories, including the new "King of the Road" car battery. Sectioned dynamos show armatures wound by the Lucas shuttle winding machine (illus. p. 905).

Arthur Lyon & Co. (Engineers), Ltd., Telford Way, London, W.3. **D.627.**—Portable generating plant up to 5 kW, automatic lighting sets, switchboards and power distribution boards, battery charging plant, pumps, motors, polishers and grinders.

M.C.L. & Repetition, Ltd., Pool Lane, Langley, Birmingham. **D.414.**—This company specializes in repetition work turned from the bar in all metals on automatic and capstan machines.

William McGeoch & Co., Ltd., 46, Coventry Rd., Birmingham, 10. **C.515.**—Exhibits comprise open type switch and fuse-gear up to 10,000 A; watertight plugs and sockets (100 A 660 V); panel indicator fittings (illus. p. 913); ironclad switch assemblies; industrial, weatherproof and watertight lighting fittings; ships' and decorative lighting fittings; brass lampholders, etc.

McKechnie Bros., Ltd., Rotton Park St., Birmingham, 16. **D.500.**—Extruded rods and sections, electrolytic copper powder and copper cathodes and solders are among this company's products.

Martindale Electric Co., Ltd., Westmorland Rd., London, N.W.9. **C.734.**—The new Mark III electric sprayer (illus. p. 923) is more powerful, quieter and robust than the earlier model, and a large air filter is incorporated. The model 53 voltage tester for testing whether circuits are alive or dead, for measuring approximate voltages, etc., is another new product. Other exhibits are "commstones," grinders, mica undercutters, slotting files, growlers, portable blowers and heater attachments, protective masks, industrial vacuum cleaners, etchers, flexible shaft equipment, and the "Vibrovertor."

Mavitta Drafting Machines, Ltd., Highlands Rd., Shirley, Birmingham. **D.714.**—Adjustable lamps.

Measure Meters, Ltd., Milltown St., Radcliffe, near Manchester. **D.748.**—Electromagnetic counters.

Mercury Discharge Lighting Co., Ltd., 1-8, Hamilton Lane, London, N.5. **C.109.**—Fluorescent lighting fittings, control gear, tubes and accessories.

Metal Porcelains, Ltd., Cornwall Rd., Birmingham, 40. **C.727/628.** — Vitreous enamelling plants, grinding mills, degreasing plant, drying ovens, etc.

Metal Processes, Ltd., 758-786, Kingsbury Rd., Birmingham, 24. **D.229.**—This company specializes in the treatment, protection and colouring of metals. Its "De-Ruster" process is claimed to be the original phosphating treatment for iron and steel.

Metalectric Furnaces, Ltd., Cornwall Rd., Birmingham. **C.727/628.**—See Incandescent Heat Co., Ltd.

Metallisation, Ltd., Barclays Bank Chambers, Dudley. **Outdoor 1348.**—Among metal spraying equipment for building up worn parts and for recovery of parts that have machining errors is the new electrically driven Mark 30 tool post pistol (illus. p. 923). It is designed for high speed operation utilizing the wire process.

Metropolitan Electric Cable & Construction Co., Ltd., Clyde Works, Chadwell Heath. **C.216.**—See Cable Makers' Association.

Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester, 17. **C.510.**—The type H single-phase on-load tap changer (illus. p. 907) for use at the 132 kV terminals of a 120 MVA 275/132 kV three-phase autotransformer with a voltage range of plus or minus 15 per cent in 18 steps is believed to be the highest voltage class of on-load tap changer made in this country. Sixty-nine are being built for auto-transformers for the B.E.A. super-grid. A scale model shows one of eight 120 kVA 132/275 kV three-phase super-grid transformers being supplied. Other exhibits include a 55 kV electron microscope; a mass spectrometer; a display of "Metrosil," a resistor with a non-linear volt-ampere characteristic; a flameproof motor fitted with a "Metrovick" constant level lubricator; control gear; and a model of a 40,000 kVA synchronous condenser.

Metway Electrical Industries, Ltd., King St., Brighton. **C.225.**—Among a full range of elements and conduit accessories, emphasis is placed on immersion heaters, flexible tubing and industrial lighting fittings. The new Metway streamlined boiling ring has a steel body with armour-bright finish and a chromium plated safety guard.

Mica Products, Ltd., Tonbridge. **C.415/314.**—See Crystalate, Ltd.

Micanite & Insulators Co., Ltd., Empire Works, Blackhorse Lane, London, E.17. **C.415/314.**—Mica, micanite, etc., mouldings, Empire varnished cloths and tapes, silicone insulation, h.v. bushings, etc.

Midland Fan Co., Ltd., 212, Aston Ld., Birmingham, 6. **A.622.**—Centrifugal and propeller fans, dust extraction plant, ventilating plant, spray booths, etc.

Midlands Electricity Board, Mucklow Hill, Halesowen, near Birmingham. **C.509/408.**—In its co-ordinated display with the British Electrical Development Association the Board deals with certain aspects of the metal industry, the "Sparcatron" flash metal cutting process being one of the most interesting exhibits.

Millet Levens (Engravers), Ltd., 47, Whadcoat St., London, N.4. **C.327.**—Dials, nameplates, indicating instruments, etc.

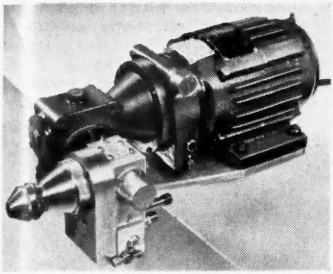
John Mills & Co. (Llanidloes), Ltd., Railway Foundry, Llanidloes. **D.337.** — Among a range of "Oilaulic" presses up to 30 tons, the 6 ton bench press (illus. p. 913) has been redesigned to give greater working speeds and the 8 ton vertical press is now fitted with a new lightweight straightening equipment.

Mono Pumps, Ltd., 67, Clerkenwell Rd., London, E.C.1. **D.716.**—The company has now extended the field of activity of the "Mono" pump to the handling of dry materials, a modified unit, driven by a 5 h.p. motor, being shown handling powdered or granulated dry material (illus. p. 905). A small wet vacuum pump demonstrated can be applied to vacuum filling machines. A "D" type pump is handling a viscous mixture to demonstrate its ability to deal with sludge sediments.

Morgan Crucible Co., Ltd., Battersea Church Rd., London, S.W.11. **D.305/204.**—Refractories include the "M.R. Super-Duty" plastic refractory of a stiff malleable consistency and a maximum operating temperature of 1,650 deg C. Among "Morganite" carbon engineering components are anti-friction parts such as crane current collectors, trolley-bus collector inserts, pantographs, bearings and seals. "Reservoil" oil-retaining sintered metal bearings, carbon brushes, brush bedding and commutator grinding stones, a new metal-carbon contact tip for controller and contactor applications, radio potentiometers, fixed resistors and interference suppressors are further items of interest.

Morganite Resistors, Ltd., Bede Trading Estate, Jarrow. **D.305/204.**—See Morgan Crucible Co., Ltd.

A. C. Morrison (Engineers), Ltd., Loughborough. **Outdoor 1330.**—Designed specifically to meet service department requirements, the "Tom Thumb" 300 W to 450 W generating set (illus. p. 927) is light,



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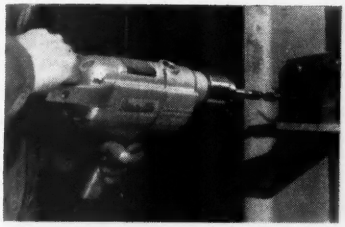

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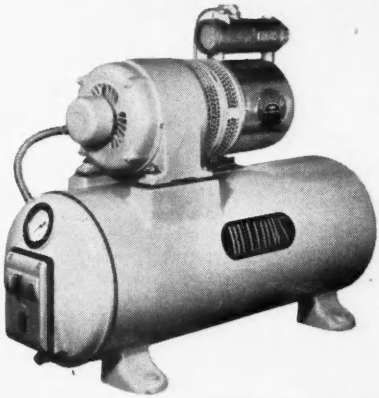

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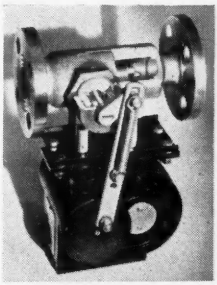

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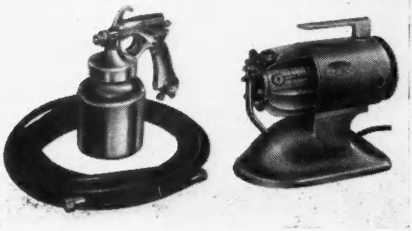

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(1) Metallisation Mark 30 tool post metal spraying pistol. (2) Desoutter 2-speed drill. (3) Wolf die grinder kit. (4) Bullows 9 cu ft/min "Hydrovane" receiver mounted compressor. (5) Rheostatic high pressure hot water valve. (6) Flexible Drives "Flexmaster." (7) Martindale Mark III sprayer

compact and easily transportable by one man. It is mounted in a tubular cradle on flexible rubber feet for carrying or bolted down to a suitable bed. This is one of a range of generating plants shown operating on diesel oil, paraffin or petrol, in sizes from 250 W to 46 kVA.

Morrison Automatic Pumps, Ltd., Loughborough. **C.231.**—Turbo deep well jet pumps range in size from 1/3 to 40 h.p. Small portable pumps and surface type irrigation pumps are also represented, as well as automatic domestic pressure pump equipment. The illustration on page 903 shows the largest and smallest pumps made, 1/3 and 100 h.p.

Moss Gear Co., Ltd., Crown Works, Birmingham, 24. **D.428.**—Reduction gears, geared motors, etc.

Moulded Products, Ltd., Chester Rd., Birmingham, 24. **C.614.** — See British Moulded Plastics, Ltd.

James Neill & Co. (Sheffield), Ltd., Napier St., Sheffield, 11. **D.610.**—Permanent magnets, permanent magnet chucks, hacksaws, engineers' hand and precision tools.

Neville's (Liverpool), Ltd., Purley Way, Croydon. **D.121.**—Particular attention is drawn to the "Pretoria" coil winding machine which can be modified to wind up to four coils at once, the "Wellington" motorized winding machine, special machines for winding heavy gauge wire, and the "Winnipeg" wave winding machine.

New Welbeck, Ltd., 94, New Bedford Rd., Luton. **C.208.**—In addition to a single high powered suction cleaner with metal dirt container there are examples of duplex and triplex composite machines which can be used as single or multiple units. Attention is also drawn to chimney sweeping equipment and commercial spraying, blowing and portable suction plant.

Newage (Manchester), Ltd., Crossley St., Manchester, 18. **D.627.**—Portable and stationary generating sets for lighting and industrial purposes.

F. D. Newcombe & Co., Ltd., 39-40, North St., Exeter. **C.714.**—Desk and wall oscillating fans.

Newman Industries, Ltd., Yate, Bristol. **C.518.**—New totally enclosed motors (illus. p. 901) comply with the draft B.S. CN (ELE) 6814. Industrial type motors with outputs from 20 h.p. to 200 h.p. are now made in slip ring or squirrel cage induction types with drip proof enclosures. Standard industrial totally enclosed motors from ½ to 30 h.p. are shown in both foot and flange mounting types. The barrel type flameproof motor (25 h.p. and 40 h.p.), which can be rolled into position, is Buxton certified for Groups I, II and III gases. Standard flameproof fan or naturally cooled units range from ¾ h.p. to 30 h.p. Loom motors with a high initial starting and accelerating torque are totally enclosed and dust-tight. Sectioned models show the application of a "Newman" motor driving a gear unit, and there is a working model of the "Elf" fractional h.p. motor.

Newton Bros. (Derby), Ltd., Alfreton Rd., Derby. **A.327/226.**—Automatic carbon pile voltage and current regulators, rotary transformers and convertors, h.f. alternators, power plant for radio and radar equipment, and spinning motors for the rayon industry.

L. H. Newton & Co., Ltd., Nechells, Birmingham, 7. **D.533.**—The new "Seetru" resilient grip mounting bolt is among a comprehensive range of precision fasteners applicable to the electrical industry.

Northern Manufacturing Co., Ltd., Gainsborough. **D.240.** — Geared motors, transmission gears, etc.

Sir James Farmer Norton & Co., Ltd., Adelphi Iron Works, Salford, 3, Manchester. **D.167.** — With improved wire drawing machines is a new high speed stranding machine. A rotary swaging machine is demonstrated and there is a scale model of a high speed automatic drawbench.

Nutt Engineering Co., Ltd., Norwich St., Cambridge. **A.205.**—Electrically driven lawn mowers (illus. p. 933) are made with both 12in and 18in blades, either self-propelled or with driven cutters only.

Oldham & Son, Ltd., Denton, Manchester. **C.414.**—A farm fence battery (illus. p. 925) is especially resistant to sulphation and plate erosion and can be left for several months without re-charging or topping up. An automatic battery supply system for shaft-signalling operates without any attention apart from topping up the batteries. A "Standard" photometer has been specially developed for checking orthodox lamproom photometers.

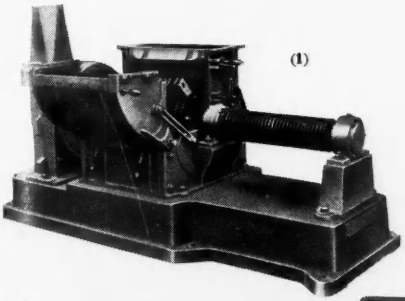
Opperman Gears, Ltd., Hambridge Works, Newbury. **D.231.**—Among "Oppigear" speed reducers is a new fractional h.p. single reduction helical geared motor.

Ormond Engineering Co., Ltd., Rosebery Av., London, E.C.1. **C.205.**—Hairdryers, toasters and repetition parts.

Osborn Manufacturing Co., Ltd., 5/13, Highgate Sq., Birmingham, 12. **C.323** — Lighting fittings include new three-light pendants.

Otter Controls, Ltd., Otters 'Ole, Market St., Buxton. **C.211.**—Protective devices for motors, automobile and aircraft circuit breakers, thermostats and load limiters.

P. B. Sillimanite Co., Ltd., Atlas Rd., London, N.W.10. **C.622.**—Granular Sillimanite for refractories, electrical appliances, tubular heaters, etc.



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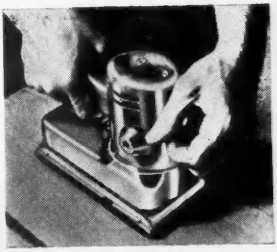

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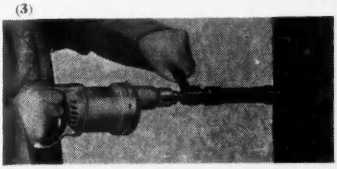

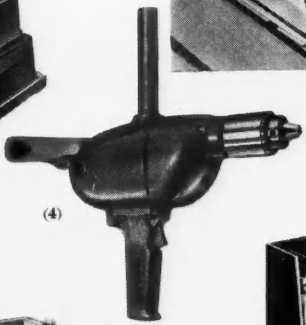

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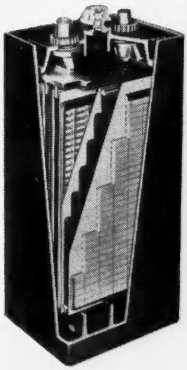

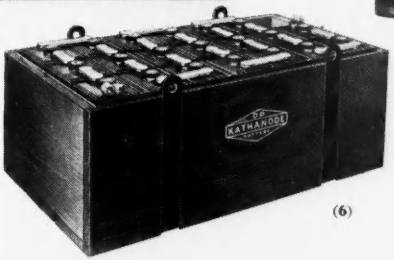

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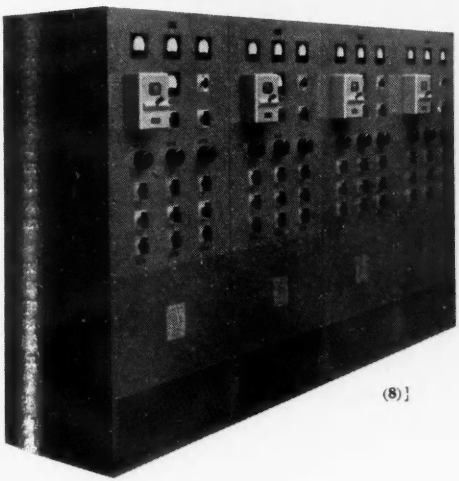

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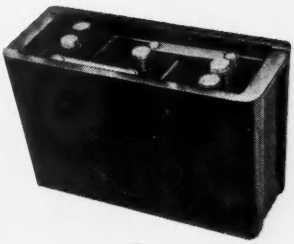

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(1) 120 h.p. "Briton" grinder (Christy & Norris, Ltd.). (2) Black & Decker No. 44 orbital sander. (3) Rawlplug drill hammer. (4) S. N. Bridges 4in drill. (5) "Exide Iron-clad" cell with "Porvic" separators (Chloride). (6) Typical D.P. "Kathanode" 40 V traction battery. (7) Oldham fence battery. (8) Section of a large Legg battery charging unit

Partridge, Wilson & Co., Ltd., Davenset Electrical Works, Leicester. **C.305.**—Rectifiers are shown for charging various types of battery. Heavy current electrolytic processing is covered by " Davenset " oil immersed selenium rectifying equipment, while a new field of activity is represented by heavy current rectifiers for the starting of aircraft and for supplying smooth d.c. power to aircraft. Power distribution transformers up to 300 kVA include the smaller mains power sizes for incorporation in electronic chassis and for l.v. hand tools, lighting sets, etc. A glass mercury bulb is typical of units up to 250 kW. Among sundry smaller and specialized components are an automatic cellar draining pump, a high discharge battery tester and a novel type of inspection handlamp.

W. H. Paul, Ltd., Longmoor Lane, Breaston, near Derby. **B.324.**—Industrial dish-washing machine and surgical sterilizer.

Payne & Griffiths, Ltd., Tudor Works, Windmill Lane, Smethwick. **D.718.**—Pressure gauges include vacuum, combined, high pressure, refrigeration, etc., instruments.

Permali, Ltd., 125, Bristol Road, Gloucester. **C.618.**—Laminated plastic materials and components include arc extinguishing devices, a 132/33 kV transformer coil end insulating ring (54in in diameter and 2in thick), a 300 kVA distribution transformer fitted with Permali end ring insulation and tapping switch parts, and a portable 500 mm sphere gap support arch for the impulse testing of transformers. Bushing insulators for switchgear and transformers are shown under the new name " Dialam " which covers all the company's bakelized paper tube and bushing products. A new l.v. insulating material called " Permaboard," an almost full-sized model " H " pole of the type used in the construction of h.v. unearthed overhead lines, silent gears, bearings, etc., are also shown.

Phœnix Sales, Ltd., Winton House, St. Andrews St., London, E.C.4. **A.609/504.**—Vacuum cleaners.

Pinchin, Johnson & Co., Ltd., 4, Carlton Gardens, London, S.W.1. **B.627/524.**—Protective and decorative industrial finishes.

Pirelli-General Cable Works, Ltd., Western Shore, Southampton. **C.216.**—Paper insulated cables up to 300 kV, telephone cables, rubber insulated cables and flexibles, cable accessories, continuous lead extrusion machines, overhead line fittings, etc.

Poles, Ltd., Nickel Works, Tyburn Rd., Birmingham. **C.409.**—Besides new " Adastra " street lighting columns there are steel sectional tapered columns for overhead lines, radio masts and floodlight towers (illus. p. 929).

Polygram Casting Co., Ltd., Power Rd., Gunnersbury, London, W.4. **C.306.**—Outstanding features of shell mouldings produced by a Polygram automatic Mark V machine are demonstrated on this stand.

Power Centre Co., Ltd., Lloyd St., Wednesbury. **C.505.**—Of particular interest among cable trunking, busbar trunking, cable-tap systems, switchgear, fuseboards, busbar chambers and accessories is the small type busbar trunking incorporating all-insulated busbars and tap-off points at 2ft centres for use with fixed-type fuse boxes. Cable trunking sections have been produced in surface, floor and underfloor forms, internal fillets enabling separate compartments to be maintained throughout the run.

Premier Electric Heaters, Ltd., Kedley St., Birmingham, 9. **C.302.**—Among fires, kettles, irons, toasters, hotplates, urns, sterilizers and blankets is the new " Smoothwell " iron (illus. p. 933), which has a consumption of 450 W and weighs 4¾ lb. Chromium plated " Pylon " kettles are again available for the home market.

Press Guards, Ltd., 372-8, Farm St., Birmingham, 19. **D.601.**—An improved interlocking guard is shown on several different presses.

Preston & Co., Ltd., Delamere Place, Chester Sq., Ashton-under-Lyne. **A.309.**—Washing machines, wash boilers and boiling pots.

Prior Stokers, Ltd., 1-3, Brandon Rd., York Way, London, N.7. **D.430.**—In addition to the Prior " Duplex " and the bunker flow type underfeed stokers this exhibit includes the " Zephair " industrial air heater manufactured by Sheet Metal Specialities, Ltd., the company's associate.

Pritchett & Gold & E.P.S. Co., Ltd., 137, Victoria St., London, S.W.1. **C.702.**—Typical automatic emergency lighting apparatus (illus. p. 911) operates with a battery of fourteen closed top cells of 30 Ah capacity, the charging and control gear being housed in a sheet steel cubicle. Stationary cells illustrate a range in glass containers and available in capacities from 10 to 1,080 Ah at the 10-hour rate. "NT" train lighting cells in Dagenite boxes are shown in section. A portable battery display consists of aircraft batteries, a heavy duty bus battery, and car batteries, all embodying separators of " Porvic " microporous plastic material.

Pyrotenax, Ltd., Hedgeley Rd., Hebburn. **C.720.**—In addition to lighting, power, heating and thermo-electric cables there are examples of catenary and concentric wiring. Sections of the concrete floor and plastered wall of the stand are heated in accordance with the latest practice.

Quiz Electrics, Ltd., 160, High St., Teddington. **C.213.**—The " Handy-Andy " hand and face drying machine is available in both floor-mounting and wall-mounting types (illus. p. 931), both pedal operated.

(1) G. H. Johnson "Hyloveyor." (2) Greenwood & Batley battery tramming locomotive. (3) Tudor batteries in lead lined wood containers as used in generating and substations. (4) Wessex "Wrigley" battery operated fork lift truck. (5) A. C. Morrison "Tom Thumb" battery-charging generator (300–450 W)

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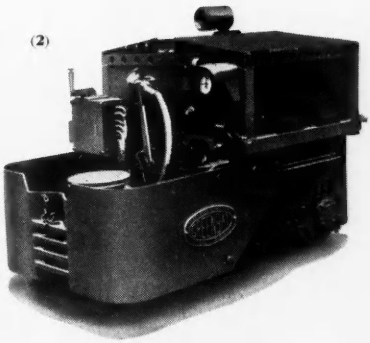

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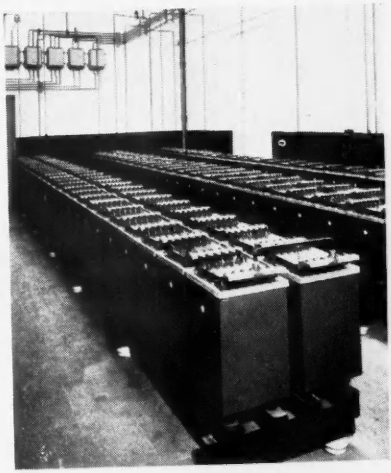

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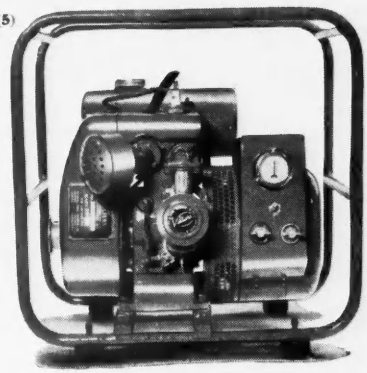


Railway Mine & Plantation Equipment, Ltd., Imperial House, Dominion St., London, E.C.2. **Outdoor 1352.**—Mobile welding plant.

Ransomes, Sims & Jefferies, Ltd., Orwell Works, Ipswich. **A.502 & Outdoor 1317/1216.**—Battery trucks include models with fixed or elevating platforms from one to four ton capacity, crane trucks, tipping trucks, tiering trucks, fork lift trucks and electric tractors up to 6 ton capacity. Among the company's lawn mowers are electric models.

Rapid Magnetic Machines, Ltd., Lombard St., Birmingham, 12. **C.421.**—Both permanent and electromagnetic separators are exhibited, new products being an electromagnetic vibratory chute type separator for treating fine powders, a portable separator for foundry sand (illus. p. 917) and a flux controlled chute, which has " Alcomax 2 " permanent magnets and can be de-energized for the removal of accumulated tramp iron. Two permanent magnetic separators for treating swarf, scrap, etc., are shown in operation as is the latest " Magnalift " electro lifting magnet, and also a 20in diameter lifting magnet. An electromagnetic ore separator is capable of treating six minerals at one passing. Also exhibited are " Magna Humps," and " Magnatraps " for inclusion in gravity, pneumatic or hydraulic ducts, pipe lines, etc.; chute type separators; self-cleaning drum and pulley type separators; electromagnetic clutches and brakes for power transmission or arrestation; a special magnet for textile machinery; an electro-magnetic percolator; the " Magnasweep Major " and " Minor " for the collection of ferrous scrap from workshop floors; permanent-magnet and electromagnetic pulley and drum type separators.

Rawlplug Co., Ltd., Cromwell Rd., London, S.W.7. **C.707.**—Demonstrations are given of hole boring and making fixings with Rawlplug tools and devices. A drill-hammer attachment (illus. p. 925) converts the rotary motion of an electric drill to a percussion action.

Revo Electric Co., Ltd., Tipton. **Outdoor.**—Street lighting columns of various types appear at the entrances to the Fair.

Rheostatic Co., Ltd., Slough. **C.500.**—Temperature control equipment includes " Satchwell " thermostats for the control of rooms, ducts, ovens and liquids, flame failure devices, motorized valves, and controls for oil burners and automatic stokers. Of special interest are two-rate modulating mixing valves for low pressure hot water heating installations, straight-through modulating valves for steam or hot water, and stainless steel h.p. hot water modulating valves (illus. p. 923). The " Satchwell " compensator is available to modulate these valves in relation to the outside weather conditions. " Service " and " Satchwell " resistors are also shown for traction and all heavy industrial applications.

Riley Stoker Co., Ltd., 19, Woburn Place, London, W.C.1. **D.617/516.**—The latest type " T " chain grate stoker for firing horizontal shell type boilers, is exhibited alongside two underfeed machines and an automatic brick kiln stoker. " Syntron " electric vibratory equipment illustrates the application of various feeder machines and a spiral feeder conveyor.

Rotherham & Sons, Ltd., Spon St., Coventry. **D.624.**—Time delays, process timers, recording clocks, etc.

Rothwell Trading Co., Ltd., 38, Market Place, Hull. **C.732.**—A new general purpose pump requires no priming, has a 27in suction lift, 600in head and weighs only 23 lb. It has only three moving parts and the action is reversible. Successful tests have been carried out pumping molasses, boiling water and jam.

Rozalex, Ltd., Norfolk St., Manchester. **D.706.**—Barrier creams, for protecting the skin from irritant materials, are available both for dry and wet jobs.

Rubber Bonders, Ltd., Dunstable. **D.650.**—Parts in rubber bonded to metal, flexible couplings, vibration and noise damping devices, etc.

Rubery Owen & Co., Ltd., Darlaston. **D.717/616.**—Materials handling plant, power transmission equipment, repetition work, etc.

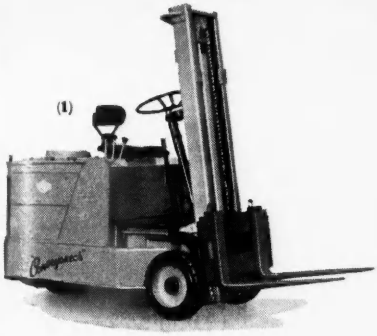
Runbaken Electrical Products, 71-73a, Oxford Rd., Manchester, 1. **C.730.**—Test equipment, battery chargers and automobile accessories.

St. Helens Cable & Rubber Co., Ltd., Slough. **C.216.**—See Cable Makers' Association.

J. H. Sankey & Co., Ltd., Aldwych House, Aldwych, London, W.C.2. **B.405.**—Refractory materials.

Joseph Sankey & Sons, Ltd., Bilston, Staffs. **C.617.**—A special feature is made of various electrical stampings made at the company's Bankfield factory, Bilston, which is claimed to be the largest and best equipped works of its kind in Europe. The company, which celebrates its centenary next year, first made stampings for Siemens as far back as 1887.

Sciaky Electric Welding Machines, Ltd., Farnham Rd., Slough. **C.222.**—The improved fully automatic heavy duty projection welding machine type P.A.D. 40 (illus. p. 919) has approximately three times the efficiency of the conventional type. Secondary currents up to 120,000 A can be obtained across the tee slot platens and a dual transformer arrangement ensures even welding current distribution over the whole area of the 14in by 14in platens. A phase shift heat control unit



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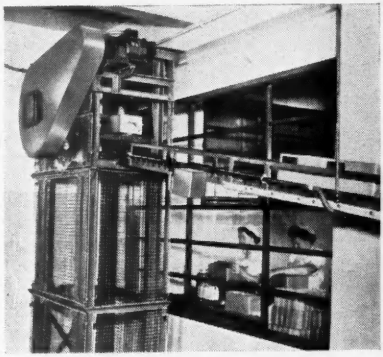

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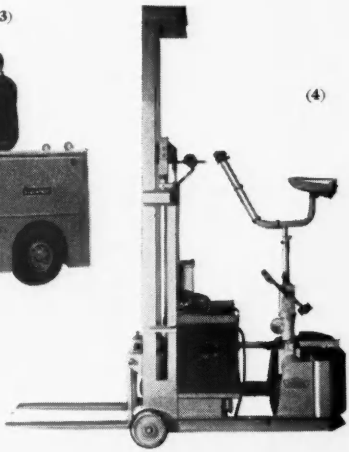

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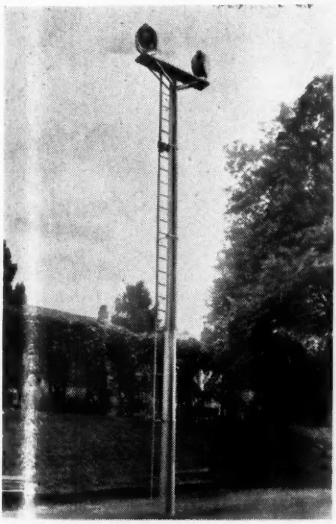

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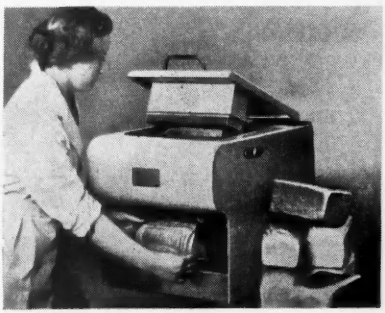

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(1) Conveyancer E2-20 battery electric fork truck. (2) Collis "VertiVeyor." (3) I.T.D. battery operated "Stacatruc" fork lift truck. (4) R. H. Corbett & Co.'s "Hydruped" fork lift truck. (5) Poles 35ft mounting height floodlight column. (6) Concentric Mfg. Co. bread slicer

operates in conjunction with an ignitron contactor panel, weld timing and forging pressure being under the control of two electronic timers. Similar machines with nominal ratings of 100 kVA and 250 kVA are also available. A pneumatically operated spot and stitch welding machine and a universal seam welding machine are also on view.

Senior Economisers, Ltd., 11, Southampton Row, London, W.C.1. **D.239.**—Scale models are shown of welded and twin-tube economizers as used in power stations.

Siemens Bros. & Co., Ltd., Woolwich, S.E.18. **C.216.**—See Cable Makers' Association.

Sigma Instrument Co., Ltd., Letchworth. **D.321.**—See Alfred Herbert, Ltd.

Silvercrown, Ltd., 178, Goswell Rd., London, E.C.1. **C.219/221.**—Plating plant includes filter presses, a new dual basket plater, a new streamlined centrifugal dryer, oil cooled selenium type rectifiers, tilting type barrel plating equipment, and air cooled resistance boards. A complete range of circuit breakers and resistance boards is fitted with remote control.

Slack & Parr, Ltd., Kegworth, Derby. **D.115.**—A small special purpose multi-drilling machine, bench or column, has been produced for use with the company's SPK gearless drill heads.

James Smellie, Ltd., Ivanhoe Works, Oxford St., Dudley. **B.628.**—Fires, table and floor lamps.

Frederick Smith & Co., 24, Queen Anne's Gate, London, S.W.1. **C.717.**—See London Electric Wire Co., & Smiths, Ltd.

Smiths Industrial Instruments, Ltd., Cricklewood Works, London, N.W.2. **D.727.**—Tachometers, counting devices, thermostats, remote indicators, speed control switches, etc.

Southern Instruments, Ltd., Fernhill, Hawley, Camberley, Surrey. **C.106.**—The new M950 universal oscilloscope (illus. p. 919) measures not only electrical quantities, but also physical quantities by the addition of auxiliary amplifiers. It can be used therefore both to study signal frequency wave-forms of all kinds, and also to measure pressure, force, strain, vibration, acceleration and similar quantities.

Sperryn & Co., Ltd., Moorsom Street Works, Birmingham, 6. **D.543.**—Switches, lampholders, ceiling roses and other electrical accessories.

Spiral Tube & Components Co., Ltd., Osmaston Park Rd., Derby. **D.710.**—Among an extended range of Mark III unit heaters is the " Spiraluxe " unit, available in 2 kW and 3 kW ratings and suitable for floor or wall mounting (illus. p. 931). It incorporates an automatic thermal cut-out and built-in switch.

Standard Telephones & Cables, Ltd., 63, Aldwych, London, W.C.2. **C.621/520.**—Telemetering systems, cable and accessories, power factor correction capacitors, valves, metal rectifiers, starting equipment and battery chargers.

Stanton Ironworks Co., Ltd., near Nottingham. **Outdoor 1322.**—Spun concrete lighting columns.

Sterling Cable Co., Ltd., Aldermaston. **Stand C.308.**—Cables embodying conductors of copper and aluminium, insulated with either rubber, p.v.c. polythene, paper or varnished cambric and protected by either tough rubber, neoprene, plastic, lead, steel wire, steel tape, metal braiding or impregnated cotton braiding, include types having electrical screens of copper or aluminium and many cables built specially for the electronics industry. The company's products now include special cable accessories, among which are line taps and clamps for aluminium conductors and watertight joint boxes for plastic insulated telephone distribution cable.

Sternol, Ltd., Royal London House, Finsbury Sq., London, E.C.2. **D.751.**—Lubricating, quenching, etc., oils.

E. W. Stockham, Ltd., 18 Camden St., Birmingham, 1. **B.628.**—Table lamps and floor standards.

Stothert & Pitt, Ltd., Bath. **Outdoor 1101/1000.**—A batch weigh plant with 21 cu ft travelling weigh hopper and hoist gear has electric travelling and hoist motions for handling 30 cwt cement containers. Vibratory concrete compacting and finishing machines are also represented.

W. & S. Summerscales, Ltd., Parkside Works, Keighley. **A.521.**—Washing machines and wringers.

Taylor & Challen, Ltd., Derwent Works, Birmingham, 19. **D.415.**—A hot brass press and a 20 ton high speed double roll feed press.

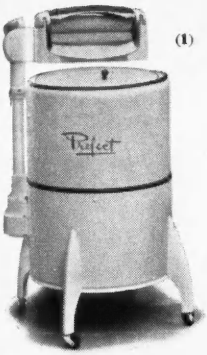
Telegraph Construction & Maintenance Co., Ltd., Telcon Works, Greenwich, London, S.E.10. **C.216.**—See Cable Makers' Association.

Herbert Terry & Sons, Ltd., Redditch. **B.424.**—Apart from making a special feature of the " Anglepoise " lamp this company is showing washers, cable clips, flexible shaft outfits, springs, neon tube clips, etc.

Thermat, Ltd., 132, Arkwright St., Nottingham. **C.516.**—See H. J. Baldwin & Co., Ltd.

Bertram Thomas (Engineers), Ltd., Worsley St., Manchester, 15. **D.309.**—Electric dinner wagons, hot cupboards, hot-plates, plate warmers, tubular heaters and motor car engine pre-heaters.

(1) Clegg & Coupe "Prefect" washing machine. (2) "Spiraluxe" wall mounting fan heater. (3) Gent & Co.'s staff locator transmitter unit. (4) Quiz Electrics hand and face drying machine. (5) Falk, Stadelmann "Sirius" lighting fitting. (6) F. H. Biddle dehumidifier. (7) Easiclene 4½ cu ft refrigerator. (8) C.W.S. thermostatic iron. (9) Dimplex "Coronation" radiator. (10) Bulpitt "Dorchester" coffee percolator. (11) Holt, Siron "Nymph Minor" illuminated shaving mirror



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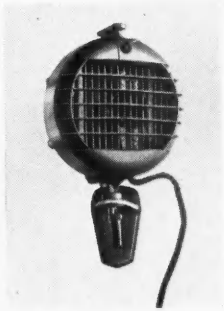
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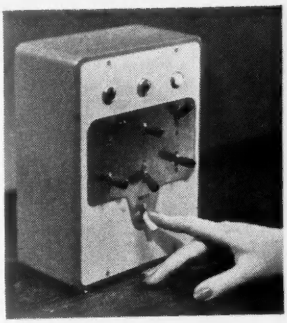
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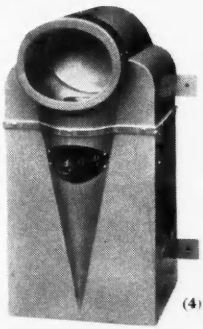
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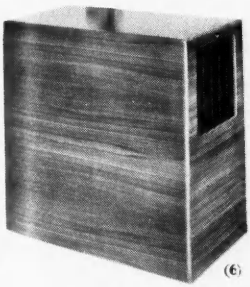
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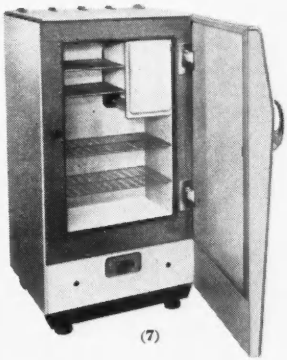
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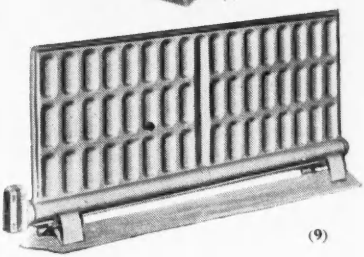
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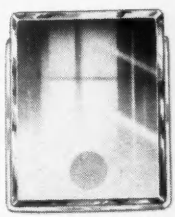
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John Thompson, Ltd., Ettingshall, Wolverhampton. **D.521/418.**—With its sixteen associated companies this company is showing chain grate stokers, submerged belt ash conveyors, a working model of a rotary pickling plant, and electronically controlled hardness detectors.

Joseph Tomey & Sons, Ltd., Catherine St., Aston, Birmingham, 6. **D.703/602.**—Gauges, switches, thermometers, etc.

Triangle Products, Ltd., Blake St., Manchester, 15. **D.155.**—Special prominence is given to a portable spot-gun welder (illus. p. 917) which has a capacity of up to two pieces of 14 s.w.g. steel at a speed of 1ft/min. It costs about 1d for 500 spots.

Trico-Folberth, Ltd., Great West Rd., Brentford, Middlesex. **C.318.**—A new omnibus direction indicator has a split case for ease of maintenance. A new range of heavy duty control switches is also offered.

Ronald Trist & Co., Ltd., Bath Rd., Slough. **D.511/408.**—" Thermofeed " regulators, " Hilo " alarms, " Mobrey " controls, level switches and governors.

Trumeter Co., Ltd., Milltown St., Radcliffe, nr. Manchester. **D.748.**—Counters are made for a variety of industrial purposes. The new " Stylus " counter (illus. p. 913), developed for counting and analysing the design of fabrics, consists of a pencil-like tube with a built-in micro switch, pressure on the small movable steel tip making a contact which is recorded on a magnetic counter.

Tudor Accumulator Co., Ltd., 137, Victoria St., London, S.W.1. **C.114.**—The principal exhibits are a " Safetylyte " automatic emergency lighting set and a switch tripping unit. Stationary batteries comprising four cells, two in boxes of lead lined wood (illus. p. 927) and two in moulded glass containers, are of the type used for powering d.c. services in over 500 B.E.A. generating and substations. The fitting of " Porvic " separators has further increased the life of the company's traction cells.

Tufnol, Ltd., Birmingham, 22B. **C.411/310.**—Specimens of Tufnol in sheet, rod and rolled and moulded tube are accompanied by engineering components produced from them. Of special interest are the collector ring assembly, a battery cover for aircraft, insulators for 11 kV circuit breakers (illus. p. 911) and gear wheels and bearings.

Turner Bros. (Birmingham), Ltd., Galvanic Works, Cliveland St., Birmingham, 19. **D.512.**—This company's products cover press tools, jigs and fixtures, moulds and dies, power presses (6-70 tons) and metal pressings to customers' requirements. A tangent bending machine has recently been developed for use in the " streamlining " of products such as refrigerator cabinets, etc. With the power presses shown is a saw tooth notching machine.

Turton Bros. & Matthews, Ltd., P.O. Box 40, Sheffield. **D.413.** — Permanent magnets.

United Ebonite & Lorival, Ltd., Little Lever, near Bolton. **C.724.**—Attention is drawn to calendered p.v.c. sheeting in new qualities, and a new range of plastic extrusions is shown. Nylon filled plastics figure prominently among compression mouldings. Battery boxes in hard rubber and composition complete the exhibit.

Universal Metal Products, Ltd., Langley Rd., Pendleton, Salford, 6. **C.415/314.**—Compression and injection mouldings for the electrical industry include injection moulded battery boxes.

Vactite Wire Co., Ltd., 24, Queen Anne's Gate, London, S.W.1. **C.717.**—See London Electric Wire Co. & Smiths, Ltd.

Vacuum Oil Co., Ltd., Portman House, 496/504, Oxford St., London, W.1. **D.629.**—The theme of this exhibit is the company's refinery and marketing organizations throughout the world, with particular emphasis upon the availability of high grade lubricants in every country. A special feature is a working model of an air-lift thermofor catalytic cracking unit, the original of which is part of the new Coryton refinery.

Vane & Schofield, Ltd., Brighton Rd., Birmingham, 12. **Outdoor 1312.**—Greenhouse heater and cooler units.

Walker Fender Co., Ltd., Despatch Works, Sherborne St., Birmingham, 16. **A.331.**—Table and floor standards in non-ferrous metals.

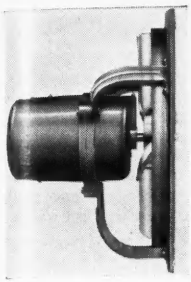
Wallington Weston & Co., Ltd., Frome. **C.415/314.**—This display consists of " Fromoprene " resin bonded board faced with synthetic rubber, " Fromoplas H.T." vinyl sheets and moulding powder, " Hibudine " synthetic rubber mouldings and extrusions, and " Fromocene " p.v.c. sheeting for insulating and other purposes.

Walls, Ltd., Station St., Tipton. **A.313.**—Boiling rings, table lamp, etc.

J. & H. Walter, Ltd., 19, Charing Cross Rd., London, W.C.2. **C.602.**—A no-cord electric iron and board, a clothes dryer and airer, and an ozonizer are products of this company.

H. C. Webb & Co., Ltd., Tame Rd., Witton, Birmingham, 6. **A.511.**—A lawn edge trimmer can be fitted to the 14in model of the " Wasp " electric lawn mower, which is also available in a 12in size.

Wessex Industries (Poole), Ltd., Dolphin Works, West St., Poole. **Outdoor 1335/1234.**—" Wrigley " battery operated driver controlled work trucks include a new



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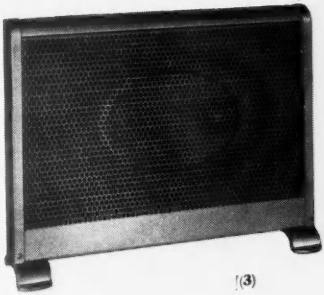

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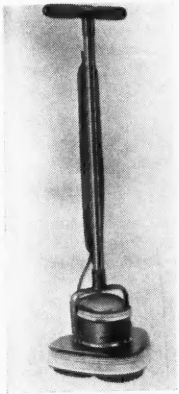

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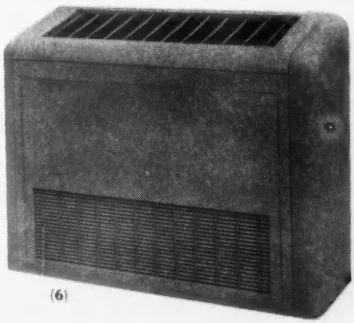

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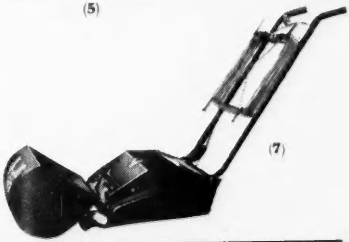

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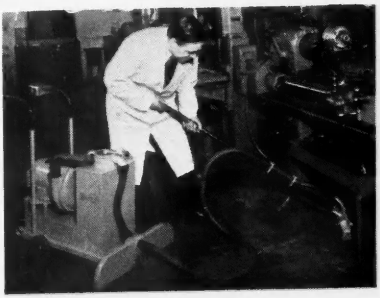

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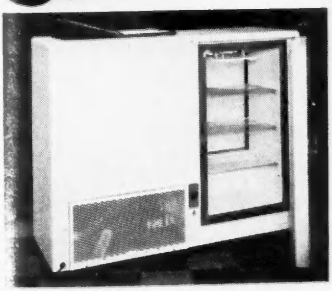

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(1) Keith Blackman "Tornado" 16in axial ring mounted fan. (2) Premier "Smoothwell" iron. (3) Berry's "Raydair" heater. (4) "Goblin Regal" vacuum cleaner (British Vacuum Cleaner & Engg. Co., Ltd.). (5) Bylock floor polisher. (6) Copperad fan cooler. (7) Nutt Engineering Co.'s "Hayn" lawn mower. (8) Columbus-Dixon improved 24in power floor dryer and squeegee. (9) C.E.A. dual freeze cabinet

fork lift truck (illus. p. 927) raising a 1,000 lb load to a height of 7ft 6in and a general purpose truck handling a 20/30 cwt load.

Westinghouse Brake & Signal Co., Ltd., 82, York Way, London, N.1. **C.508 & Outdoor 1339/1238.**—A new method of machining metals by spark discharge is demonstrated, the necessary d.c. supply being obtained from a "Westalite" rectifier. A working exhibit indicates the effectiveness of cathodic protection by the constant current system for combating corrosive action in docks and piers and upon ships' hulls. A new constant potential rectifier equipment, the "Transbooster" (illus. p. 907), is capable of holding d.c. output voltage values to plus or minus 1 per cent under varying load conditions, mains variations of +6 or −10 per cent and supply frequency variations of up to −4 per cent. Developments in electro-deposition power equipment include the new finger-tip control upon auto-transformer controllers. A new constant current density controller permits correct control for changing vat conditions. A compressor supplies air for air control. Among colliery exhibits are an intrinsically safe electro-pneumatic valve and transformer for use in gaseous atmospheres. In addition to a demonstration of automatic railway signalling using coded track circuits there is a selection of a.c. and d.c. plug-in relays, point valves and terminal blocks.

Westool, Ltd., St. Helens, Auckland. **D.351.**—Among a wide range of solenoids is the new series 700 flame-proof a.c. model (illus. p. 907) as well as the series "C" and "L" d.c. solenoids, the last-mentioned being for use in the control of jet engines.

Whitecross Co., Ltd., Warrington. **D.621.**—Bright annealed wire, coppered, galvanized, tinned, round and shaped wires; welding wires, etc.

R. R. Whitehead & Bros., Ltd., Royal George Mills, Greenfield, near Oldham. **D.753.**—"Regalpak" anti-vibration pads.

Wilkins & Mitchell, Ltd., The Green, Darlaston. **C.517.**—"Servis" washing machines include heated models.

Wilkinsons Tools, Ltd., Kerfoot St., Warrington. **D.147.**—Electricians' tools are supplied insulated with p.v.c.

Wilmot, Breeden, Ltd., Amington Rd., Birmingham, 25. **C.416.**—Refrigerator components and fittings.

R. H. Windsor, Ltd., Royal London House, Finsbury Sq., London, E.C.2. **C.413/312.**—Four new machines for the plastics industry are shown: a 1 oz automatic injection moulder, a 2 oz hand-operated machine, an improved version of the RC 100 lb extrusion machine, and an 8/10 oz injection moulder.

Wire Drawing Dies (Manchester), Ltd., Adelphi Iron Works, Salford, 3. **D.167.**—

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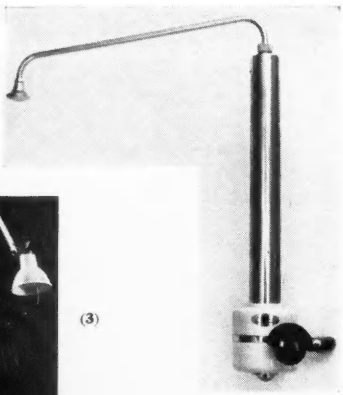

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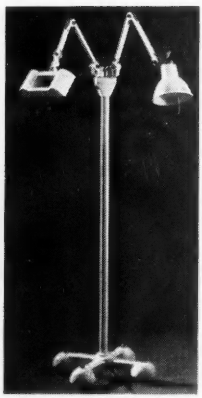

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(1) Campbell "Hotwa" shower unit. (2) Doulton porous ceramic diaphragms, etc., for electrolytic processes, etc. (3) Electric Depot "Lens Light" dual-purpose surgery lighting equipment. (4) H. J. Baldwin wash boiler element

Typical products include diamond dies, tungsten carbide dies, mandrels, plugs, floating plugs and similar products.

Wireohms, Ltd., 132, Arkwright St., Nottingham. **C.516.**—See H. J. Baldwin & Co., Ltd.

Witlor, Ltd., 107-109, Lancaster St., Birmingham, 4. **Outdoor 1324.**—The "Merlin" washing machine is available with either hand or power wringer.

Woden Transformer Co., Ltd., Moxley Rd., Bilston. **C.311.**—Transformers range from small compound filled units for electronic equipment to distribution transformers of 750 kVA capacity, units being shown suitable for low-voltage lighting, electro-medical equipment, broadcasting apparatus, welding, screen-heating, electric furnaces, etc. "C" core hermetically sealed components are also shown.

Wolf Electric Tools, Ltd., Pioneer Works, Hanger Lane, London, W.5. **C.603.**—New items are the RS 7 saw with a 7in blade, the GQ 6 portable grinder and the DG 1 grinder kit (illus. p. 923). Both saw and grinder are powered by new motors. Demonstrations are given of other portable electric tools, soldering guns and soldering irons.

Wolseley Sheep Shearing Machine Co., Ltd., Birmingham, 6. **D.713 & Outdoor 1351/1250.**—Pumps, elevators, dairy equipment, bucket heaters, two-speed machines, sheep shearing and cattle and horse clipping machines, the "Radio Ferret," an improved battery operated humane drover, de-birding equipment, and the C.J.R. tape recorder make up this exhibit.

J. W. Woolley & Co., Ltd., Two Gates, Tamworth. **C.119.**—"Electrobloc" space heaters having a low off-peak load are suitable for small factories, village halls, etc. Low loading sterilizers give instant steaming.

Wynn, Timmins & Co., Ltd., Century Works, Commercial St., Birmingham, 1. **D.118.**—Heavy linesman's pliers are a new "Heart Brand" product.

Yale & Towne Manufacturing Co., Ltd., Willenhall. **A.329/228.**—Mechanical handling equipment.

Yardley Wavis, Ltd., Wyle Cop, Shrewsbury. **C.704.**—D.c. and a.c. generators are available from ½ kW to 75 kVA. Fully automatic battery charging equipment is also supplied.

Yorkshire Copper Works, Ltd., Leeds. **B.723/634.**—Non-ferrous tubes are made to meet all electrical requirements.

Yorkshire Switchgear & Engineering Co., Ltd., Meanwood, Leeds, 6. **C.419.**—A seven-panel h.v. metalclad switchboard (illus. p. 907) is one of several being supplied to a Government factory. H.v. switchgear with the same general appearance is also being supplied. To give operatives readier access to relays, etc., the instrument panels have been brought forward to the front of the switchgear. For outdoor service the instruments are generally housed in a separate weatherproof compartment. A new arc trap applicable to h.v. switchgear is exhibited for the first time.

Zinc Alloy Rust-Proofing Co., Ltd., Shakespeare St., Wolverhampton. **B.724.**—This company specializes in rustproofing, by the sherardizing process, of electrical conduit, nuts, bolts, washers, etc.

DISPLAYS IN LONDON

Exhibits are at Olympia Unless Otherwise Stated

Allied Metals, Ltd., 62, London Wall, London, E.C.2. **B.14.**—See Saniguard Appliances, Ltd.

Ardente Hearing Service, 309, Oxford St., London, W.1. **B.6.**—Miniature hearing aids include magnetic earphones, audiometers and sound reproduction equipment.

Barrywald Products, Ltd., 62, London Wall, London, E.C.2. **B.14.**—See Saniguard Appliances, Ltd.

L. M. Beasley & Co., Ltd., 5, Stafford Rd., Caterham. **M.73.**—Lighting fittings.

Bellow Machine Co., Ltd., Grafton St., Leeds. **B.533/638.**—Industrial sewing machines, cloth cutters, etc.

E. J. Bowman (London), Ltd., 58, Paddington St., London, W.1. **Earls Court S.12.**—The "Magimix" mixing machine.

Chas. F. Bristol & Son, Ltd., Regent Place, Birmingham, 1. **M.5.**—"Flosmaron" lighting fittings and shades.

British Brehmer, Ltd., 11-13, Sekforde St., London, E.C.1. **G.51.**—Machines for the boxmaking, packaging, printing and bookbinding trades include thread book sewing, wire stitching and stapling machines.

British Doughnut Co., Ltd., 137, Clapham Rd., London, S.W.9. **Earls Court S.11.**—All-electric, automatic doughnut machines include models producing 200 dozen and 35/40 dozen doughnuts an hour.

British Ebonite Co., Ltd., Nightingale Rd., Hanwell, London, W.7. **Earls Court X.10.**—Ebonite rod, tube, sheet, mouldings, and machined parts.

British Geon, Ltd., 21, St. James's Sq., London, S.W.1. **D.7/12.**—P.v.c. for electrical use.

British Resin Products, Ltd., 21, St. James's Sq., London, S.W.1. **D.7/12.**—Moulding materials and adhesives are specialities.

British Vacuum Cleaner & Engineering Co., Ltd., Goblin Works, Leatherhead. **Earls Court W.3.**—A large range of cylindrical vacuum cleaners is available complete with accessories. The new "Goblin Regal de Luxe" upright bag model incorporates a power driven brush and a dust finder headlight. By the removal of the handle the "Goblin Wizard" upright bag model is easy to use in the hand.

Bylock Electric, Ltd., South St., Enfield. **Earls Court W.5.**—See Birmingham Section.

L. & I. Clarke, 10, Colebrook Rd., Southwick. **M.42.**—Lampshades in calf skin, sheepskin, silk, etc.

John Compton Organ Co., Ltd., Minerva Rd., North Acton, London, N.W.10. **K.2.**—The "Electrone" electronic organ is operated electrostatically by means of twelve discs, one for each note of the scale driven by an endless belt from a synchronous motor. The discs, which consist of two stators and one rotor with a gap of 0.015in, are suitably engraved and a difference of potential is generated and fed into an l.f. amplifier. Thirty-two harmonics used to obtain the wide range of tone colours required are secured by use of resistors of varying value.

Counting Instruments, Ltd., 5, Elstree Way, Boreham Wood. **B.40.**—Electromagnetic counting instruments.

Creators, Ltd., Silmay Works, Kings Rd., New Haw, Weybridge. **Earls Court X.2.**—Thermoplastic extrusions, injection mouldings and insulating sleevings.

R. Cruickshank, Ltd., Camden St., Birmingham. **D.6.**—A selection of heavy chemicals includes electroplating salts and solutions.

Geo. Davidson & Co., Ltd., Teams Glass Works, Gateshead. **C.6.**—Lighting glassware.

Electrix, Ltd., Sterling Works, Dagenham. **Earls Court W.1.**—Vacuum cleaners, floor polishers, sprayers and the "Handyman" light sanding, polishing and drilling machine.

Elliott & Spear, Ltd., Oakhill, Hildenborough, Tonbridge. **M.89.**—Table lamps and lampshades.

English Numbering Machines, Ltd., 25, Queensway, Enfield. **B.28.**—Counting and numbering machines include a large range of automatic units.

Fillerys (Gt. Britain), Ltd., 41, Sackville St., London, W.1. **Earls Court W.6.**—A combined floor polisher and vacuum cleaner (illus. p. 937) is designed so that the polishing brushes retract well above carpet level when required for vacuum cleaning. When polishing, the suction continues to operate and disposes of the dust.

Fonadek (Branson), Ltd., Vivian Rd., Birmingham, 17. **J.9.**—Telephone amplifiers for office and home.

Funditor, Ltd., 3, Woodbridge St., London, E.C.1. **G.42.**—Heaters for composing machines, remelting furnaces, etc.

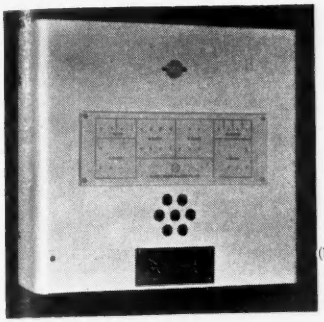
Gascoignes (Reading), Ltd., Reading. **B.12.**—The "Humalactor,' which provides a solution to human lactation and infant nutrition problems, is available for operation either from the mains or from a 12 V battery.

Gestetner, Ltd., Aldwych House, London, W.C.2. **J.3/13.**—Duplicators include models claimed to take more paper sizes than any other machine of their kind in the world. The feedboard accommodates up to 17¼in by 14½in, yet cards measuring 5in by 3in can be duplicated with equal facility.

Gooch & Housego, Cornhill Factory, Ilminster, Somerset. **B.8.**—Quartz crystal blanks are shown in various stages of production, together with fused quartz components.

Hadley Sound Equipments, Ltd., Smethwick. **J.16.**—Through a master unit linked with either six or twelve extensions a new personal intercommunication system gives immediate and direct contact between, say, a business chief and his key executives, an additional feature providing for loudspeaking reception of telephone calls. The "Multicom" provides complete intercommunication between all points either by loudspeaker or ordinary hand telephone. A working model of the Hadley "Call Nurse" system (illus. p. 937) is of particular interest. For hotels, etc., coin-operated radio equipment has considerable appeal. Another Hadley equipment, designed particularly for school use, provides intercommunication, radio reproduction, gramophone amplification or speech broadcast. A new spherical loudspeaker is useful for halls with difficult acoustic conditions.

Hanovia, Ltd., Slough. **B.3.**—Applications of ultra-violet ray lamps to industry include the alteration of the chemical, physical or biological composition of substances; degradation tests of paint, dyes, bitumens, rubber, etc.; and the production of hard transparent joints in "Perspex." Sterilization, the chief biological change, can be effected in both air (by bactericidal tubes producing short-wave rays) and water, which is treated in the Hanovia water sterilizer (illus. p. 937) incorporating a high-pressure quartz mercury arc tube. Fluorescence by means of ultra-violet rays is useful for detecting cracks in castings, forgings, etc. A mercury vapour detector is another item of interest.



(1) Hadley "Call Nurse" control unit. (2) Hanovia water sterilizer. (3) Pye "Polly" tea making apparatus. (4) Taylor 160 A output meter. (5) Fillerys combined floor polisher and vacuum cleaner. (6) Smiths "Queensdale No. 2" clock. (7) Kego table lamp. (8) Stuart Turner portable pump set, 600 gal/hr 5ft head

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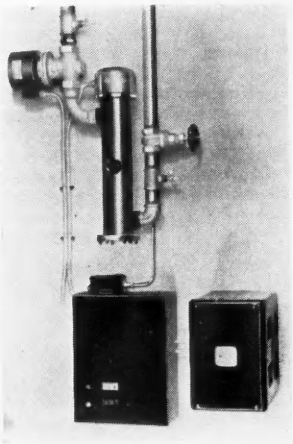

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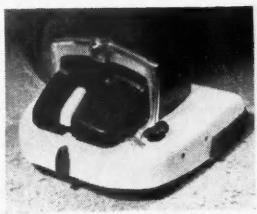

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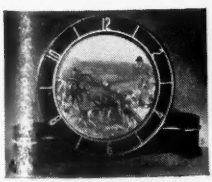

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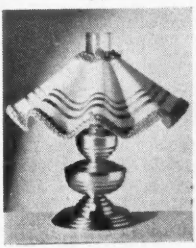

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Hartley Electromotives, Ltd., Octopus Works, Monkmoor, Shrewsbury. **J.25.**—The "Tape-Riter" dictating and recording machine can be used both for transcribing and dictating for personal use, for recording interviews and conferences, or for stocktaking. The record can be stored indefinitely or erased immediately.

Homeshade Co., Ltd., 99, Baker St., London, W.1. **M.58.**—Lighting fittings.

Hoover, Ltd., Perivale. **Earls Court W.2.**—A full range of cleaners and polishers accompanies the new washing machine referred to in the Birmingham Section.

Hyders, Ltd., 10, Fitzroy St., London, W.1. **M.86.**—Wrought iron lighting fittings.

Imperial Chemical Industries, Ltd., Imperial Chemical House, Millbank, London, S.W.1. **D.32.**—A mural picture depicts the evolution of chemistry between the reigns of the two Elizabeths.

Jennings Organ Co., Unity Works, Dartford. **K.5.**—In addition to electronic organs suitable for theatre and church there is a new "Univox" electronic keyboard, which, weighing only 38 lb, is portable and can be fitted to any convenient stand to give three full octaves (six when completed), reproducing the sounds of thirty-five orchestral instruments.

Johnson, Matthey & Co., Ltd., 73-83, Hatton Garden, London, E.C.1. **L.220/305.**—Developments in the refining of precious metals are symbolized by a special exhibit, with displays depicting stages in the production of gold, silver and platinum.

Kego Electric Co., Ltd., Mount Pleasant, Wembley. **M.25.** — Lighting fittings in polished and lacquered brass are suggestive of old oil lamps with their glass chimneys and dainty shades. A table lamp (illus. p. 937) is suitable for use when viewing television.

Walter Lambert, Ltd., 7, Glamis St., Bognor Regis. **M.5.**—"Exquisart" lampshades.

Leevers-Rich Equipment, Ltd., 37, Wardour St., London, W.1. **B.13.**—Tape recording equipment.

E. & H. Lewy, Ltd., 57, Jamestown Rd., London, N.W.1. **M.20A.**—Lighting fittings.

Loma Electronic Equipment, Ltd., 27-29, Union Street, Southwark, London, S.E.1. **B.29.**—The improved "Metaltector" industrial metal detection equipment has increased sensitivity and affords a completely automatic inspection for the detection of metal, ferrous or non-ferrous, in any non-metallic material. Each equipment has a detecting head specially built to suit the produce to be inspected, and multi-channel equipments permit the operation of a number of detecting heads from one control unit, each having a separate relay working independently of the others. Ejection systems can be fitted if required.

Magneta Time Co., Ltd., Goblin Works, Leatherhead. **J.15.**—See British Vacuum Cleaner & Engineering Co., Ltd.,

Miller Organ Co., Ltd., Osborne Buildings, Timberhill, Norwich. **K.3.**—Electronic organs.

Modern Telephones (G.B.), Ltd., Telesound House, 101, Tottenham Court Road, London, W.1. **J.37.**—With "Telesound" loudspeakers installed at key points in premises, it is possible to speak to all the people in a room, and for the one person who is wanted to reply through the loudspeaker to the caller. The system is linked with internal telephones, so that a "Telesound" call can be initiated by any executive from the telephone on his desk.

National Cash Register Co. (Manufacturing), Ltd., 206-216, Marylebone Road, London, N.W.1. **J.12.**—Accounting and adding machines.

Neon Ideas, Ltd., 102, Lee High Rd., London, S.E.13. **A.19.** — Neon display devices.

New Welbeck, Ltd., 94, New Bedford Rd., Luton. **Earls Court W.4.**—See Birmingham Section.

Perihel, Ltd., 17, Edge St., London, W.8. **B.43.**—Ultra-violet and infra-red apparatus, air sterilization equipment, fluorescent lighting tubes and fluorescent desk lamps.

Permutit Co., Ltd., Permutit House, Gunnersbury Av., London, W.4. **D.16.**—In addition to their application to water softening, ion exchange materials can be used for recovering valuable metals such as chromium, copper and silver from waste effluents, etc.

Pifco, Ltd., Watling St., Manchester, 4. **B.26/33.**—Electro-medical appliances, decorative lighting sets, night lights, torches and domestic electrical apparatus.

Printac, Ltd., Lewis St., Cardiff. **O.29 and M.34.**—Transformer laminations.

Pullars Instruments, Ltd., Hollingbury Rd., Brighton. **L.318.**—Timing switches, including minute timers for cookers.

Pye, Ltd., Cambridge. **B.46.**—A "Staticon" miniature industrial television camera is set up on the stand in the same way as it would be used in televising dangerous experiments for radio-active materials. The Pye "Polly" tea making apparatus (illus. p. 977) is the first of a series of domestic appliances for export.

Rejafix, Ltd., 81/83, Fulham High St., London, S.W.6. **J.1.**—Machines for printing, marking or decorating articles of any size, description or material include an improved fully automatic model with an output up to 7,000 articles per hour.

Rose Brothers (Gainsborough), Ltd., Gainsborough. **G.15.**—Automatic wrapping, packaging, filling and labelling machines.

Rotosigns, Ltd., 207, Victoria St., London, S.W.1. **B.7A.**—A novel mains operated animated advertising device, in which a panel rotates at intervals to give a two-part message, has applications in every sales business. No motor or battery is incorporated and mystification is aroused by there being no apparent electrical connection.

Saniguard Appliances, Ltd., 62, London Wall, London, E.C.2. **B.14.**—"Eldorite" insulating jackets for hot water cylinders are fitted with non-corrosive fire and vermin proof mineral fibre and can be covered with a variety of different materials to suit individual requirements. The Barrywald automatic incinerator provides a ready means of disposing of septic bandages, surgical dressings, etc.

Simon Equipment, Ltd., 48-50, George St., London, W.1. **B.44/47.**—Sound recording and reproduction equipment.

Smiths English Clocks, Ltd., Sectric House, Waterloo Rd., Cricklewood, London, N.W.2. **L.318.**—The latest "Sectric" clocks include the "Queensdale No. 2" (illus. p. 937) depicting a hunting scene; the "Clipper," with a representation of an old time sailing ship; the "Country Life," showing a woodland scene; the "Neville" mantel clock in walnut, and the "Besford" in oak with gilt bezel and numbers.

Speights, Ltd., Classic Works, Mill Rd., Dewsbury. **M.54.**—The new "Formashayd" lampshade is detachable, washable, collapsible and only a little over half the price of a conventional shade. It gives an even distribution of light and the special setting of the spars from top to base eliminates objectionable shadows.

Stabilag, Co., Ltd., 1, Broad Street Buildings, Liverpool St., London, E.C.2. **B.38.**—An electric resistance heating jacket, constructed from fibreglass or quartz cloth with a closely pitched resistance wire, provides direct heating of liquids at a constant heat wavelength within the infra-red range. It is particularly suitable for viscous liquids and is made to fit the specific contour of the vessel to be heated. Maximum temperatures are 500 deg C to 700 deg C. Exhibits include fluorescent and cathode ray tube heating jackets for rapid heating during manufacture and assembly, an embedding oven, a jacketed food tilting and mixing pan and a rubber-lined jacketed tank.

Sterling Light Co., 50, Ledbury Rd., London, W.11. **M.94.**—The Sterling Light flush fitting inverted cone shades are supplied in 20, 26, 30 and 38in diameter sizes in "Hynon" washable plastic material or buckram. Shades for wall lights, table and floor standards are available to match.

Stokes Fountains, Ltd., Church House, Godalming. **M.38.**—Electrically operated fountains for garden or table use.

Stuart Turner, Ltd., Henley-on-Thames. **H.19.**—Pumps for marine, industrial and agricultural applications include a new portable electric pump (illus. p. 937) with a capacity of 600 gal/hr, 5ft head.

Taylor Electrical Instruments, Ltd., 419/424, Montrose Av., Slough. **B.39.**—The model 160A output meter (illus. p. 937) is typical of radio and television test gear.

Thermo-plastics, Ltd., Luton Road Works, Dunstable. **Earls Court X.6.**—Refrigerator, etc., components.

H. J. Thormann Engineering Co., Ltd., 5, Elstree Way, Boreham Wood. **B.40.**—Diecastings, number wheels and meter pinions.

Thornton-Owen, Ltd., Charles Holland St., Willenhall. **M.83.**—Lighting fittings.

Ultra Lens Co., Finsbury Court, Finsbury Pavement, London, E.C.2. **B.48.**—The "Ultra" illuminated magnifying lens has applications in many industries. It can be operated by a self-contained battery or from the mains by means of a bell transformer.

Waite & Son, Ltd., Menin Works, Bond Rd., Mitcham. **M.80.**—Lighting fittings.

Walker Electronics, Ltd., 31, Kingsmead Av., Worcester Park. **L.314.**—Electronic watch timers.

Australian News

From a Correspondent

THE possibility that Australian power development could be spread over a longer period in view of the lessened economic activity is a suggestion put forward by the Bank of New South Wales. It points out that under the boom conditions of two years ago, electricity generation "seemed an absolute priority to meet the seemingly endless demand for power. . . . But in the current less-hectic state of economic activity the augmented generating capacity is not nearly so hard pressed."

Latest production figures from the Commonwealth Statistical Bureau show that the output of electrical appliances has been affected by changed business conditions. Output of washing machines has fallen by about 1,500 a month, December production being 6,559; vacuum cleaner production is down by about 50 per cent; toasters have dropped from 16,345 to 9,600; irons from 18,633 to 14,000; and water jugs from 16,894 to 11,299. Output of radio sets (except portable types) is down from 10,090 to 8,308; but the production of portable sets, which averaged 7,123 in 1951–52, increased to 10,861 in December.

Abrasion-Resistant Linings

Possibilities for Use in Power Station Plant

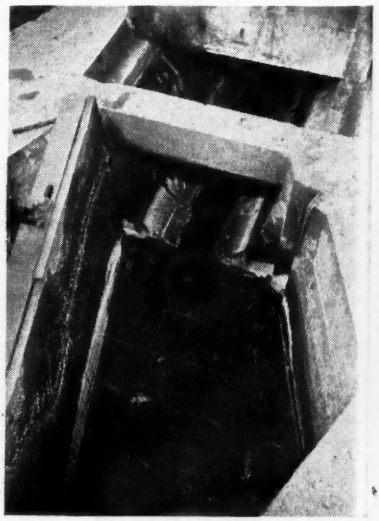
INDUSTRIES handling large tonnages of coal, coke and ash are faced with an abrasive problem which can be very costly. Many parts of coal handling and ash disposal plants are subjected to exceptionally heavy wear and, in order to avoid inconvenient and prohibitive replacements, channels must be lined with materials which are highly resistant to abrasion. In the worst conditions of abrasion and corrosion, however, brick and metal liners can give only a limited period of service without being renewed. Cast basalt, a material derived from volcanic basalt, has been found to be one way of reducing shut-downs and maintenance costs. Practical tests have shown that it has a life ten to twenty times that of the finest steel plate and that its abrasive resistance far exceeds that of the hardest chrome or manganese steel. A cast basalt tile, originally 1¼in thick, was removed from an ash race at a London power station after it had been subjected every day for ten years to the abrasion of about thirty-five tons of coke. On examination at the end of that period it was found to have worn down by only ¼in whereas in the same ash race cast iron liners 1in thick required renewal after a matter of months.

Physical and Chemical Properties

Basalt is a volcanic rock which is one of the hardest naturally occurring materials known. Selected pieces are melted at high temperatures and cast into moulds, the resistance of the final product to both abrasion and corrosion being greatly increased. A compressive strength of over 70,000 lb/sq in is developed and the finished product has a Mohs' scale hardness of 8 to 9, as compared with the diamond's 10. It is unaffected by concentrated acids and is impervious to strong alkalis and other aggressive liquids at all commercial concentrations or temperatures.

Cast basalt was introduced by H. Windsor & Co., Ltd., some years ago and is in growing demand for the solution of difficult abrasive problems. The largest users are the gas industry, iron and steelworks, electricity authorities and coal mines, but cast basalt linings are potentially useful to any undertaking with an ash disposal problem.

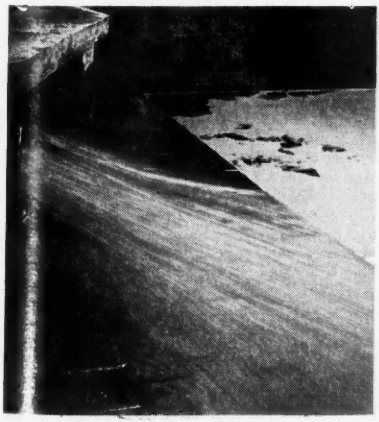
Cast basalt is available in the form of tiles of various stock sizes, which are mass-produced. The thickness normally supplied is 1¼in, which experience has shown to be satisfactory for most purposes, but if resistance to very heavy impact is desirable a thickness of 1½in is recommended. Production difficulties limit the sizes of tiles which can be produced and also prevent the production of complicated shapes. At one time cast basalt liners could only be obtained in the form of square and



rectangular tiles 8in by 8in and 8in by 4in respectively. Nowadays curved tiles can also be supplied and a variety of special designs are available which facilitate the lining of many types of plant. A conventional rectangular chute, for example, may be lined with cast basalt by using coved and flat liners; one-third round ash race liners are also available. Cast basalt tiles are normally heat resistant up to 580 deg F, but this limit can be raised to 740 deg F by using hexagonal tiles, which approximate more closely to the shape of a circle so that the heat stresses are more uniformly distributed over them than over tiles of conventional shape. Another advantage of hexagonal tiles is that they give a continual change of direction of joints.

Because of its hardness cast basalt is extremely difficult to cut to shape. Cutting is done either with a hardened chisel or a bricklayer's hammer, by chipping a groove at least $\frac{1}{8}$in deep. The tile is then snapped and should break along the direction of the cut. Unless grooving has been done with great care, jagged edges which make tight joints impossible are often left. Most orders are, therefore, executed to users' special needs and for complete linings a laying plan showing the exact position of each individual tile is supplied. These special orders eliminate the need for the laborious cutting process. Cast basalt tiles are normally set in a sand-cement bed. When wet coal, coke, or ash are handled there are usually small quantities of sulphurous liquors present which attack cement mortars. This difficulty can be overcome by using special acid-resisting cements, spatulas or ciment fondu and granite. The bending strength of cast basalt being less than that of cast iron, care must be taken that any bending load is taken up fully by the base. The structure being lined must be free from vibration or, alternatively, stiffening by means of angle irons must be carried out; otherwise, the bedding will crack and the tiles will be loosened.

Left: Ash sluice lined with cast basalt in a Midlands power station; note the staggering of joints which is of great importance. Below: Spillway of ash pit in same power station—*By courtesy of B.E.A.*



Prefabrication Method

In power stations, steelworks, or factories where stoppages must be kept the an absolute minimum difficulties may be caused by the time required for the bedding to set sufficiently firmly for the liner to be brought into commission. Some users, therefore, make up a precast concrete block incorporating the tiles, or else set the tiles on a steel or cast iron tray. When the tiles require to be renewed the concrete box or tray is simply placed into position, the plant being out of action only during the time when the trays are actually being switched over.

Since cast basalt is not very much heavier than aluminium, its installation does not add considerably to the weight to be borne by the supporting structure, so that no major alterations need be made to the plant which is being protected. All types of channels and ash races—whether iron, steel or concrete—can be lined and walls can be protected to any desired height without difficulty. Bunkers of any size and shape can be suitably protected, roofs between outlets being fully covered by capping and angle tiles cast to shape and size. When used in chutes and sloping channels, cast basalt has the advantage of presenting a more favourable angle of slip than any steel plate.

Another type of application in which cast basalt tiles are giving very satisfactory results is as protective liners for the steel shells of cyclones and dust extractors, which are quickly abraded by the action of dust particles travelling at high speed.

While cast basalt will withstand pure abrasion (i.e., purely a slipping movement

over the surface) up to twenty times as long as mild steel or chilled cast iron, its resistance to impact is inferior to that of other materials which resist abrasion. It should not be considered, therefore, for applications in which the material being handled simply drops on to the liner without any sliding motion. If the liner is subjected to a combination of impact and abrasion, the conditions responsible for wear should be carefully studied and analysed before this material is specified. Considerable experience has been accumulated of this type of problem both in this country and abroad by H. Windsor & Co., Ltd., and advice about the suitability of cast basalt for any particular application is readily given, if full particulars of each problem are available.

The cost per yard of a cast basalt lining is approximately seven times that of the same lining in bluebrick, but the more expensive material may be the most economical in the long run because of its very much greater service life.

After having tried bluebrick paviors and chilled cast iron 1in thick, the Coke Oven Department of the Stanton Ironworks, Ltd., near Nottingham, specified cast basalt tiles for the linings of its coke chutes. In this application the material was subjected to both impact and abrasion. The average life of the cast basalt tiles was 45 weeks and 202,000 tons of coke, compared with six weeks and 27,000 tons for chilled cast iron, and $2\frac{1}{2}$ weeks and 11,250 tons for bluebrick paviors, 12in by 6in by 3in. Thus, the cast basalt tiles lasted approximately 14 times as long as bluebrick paviors.

The aggregate cost of materials over an equal period of time was considerably less when cast basalt was used and, in addition, there was a substantial saving of labour cost and working hours lost during relining. In coke chutes at the works of the Appleby-Frodingham Steel Co., red bricks had a life of 42 days, while cast basalt is still in service after 205 days.

Cast basalt can also prolong the natural life of hard steel pipes and conduits used in handling dust, ash, or pulverized fuel. The lining of steel pipes with cast basalt cylinders is carried out with special apparatus. The cylinders are exactly centred and cement mortar is then inserted under pressure between the steel pipe and the liner, thus ensuring a completely homogeneous filling and providing a secure and lasting bedding for the liner. Depending on a number of factors, such as the material conveyed, type of piping used, speed of flushing, quantity of flushing water, etc., the life of conduits lined with cast basalt has shown a variation in throughput ranging from 296,000 to 2,960,000 cu ft before complete abrasion renders the installation unserviceable.

Nationalization and the Public

THE last of the Acton Society Trust's papers on nationalized industry is now available. It is entitled " Relations with the Public " and is obtainable from the Trust at 39, Welbeck Street, London, W.1, price 2s. (The whole series of twelve can be obtained for 21s including postage.)

It is the purpose of this study to describe how nationalized industries attempt to discover the views and wants of the public, how they endeavour to explain to the public their difficulties and achievements, and how the public can make its desires known. It is remarked that the citizen is primarily interested in the industries' local affairs and that the boards must seek to develop a sense of proprietary pride in their employees.

Mention is made of the methods adopted by public relations departments for the assessment of public opinion; informative publications issued by the boards; statistics and technical information; exhibitions, visits, etc.; Press information and other relative matters.

The annual reports of the boards are criticized. Although, it is said, they contain a great deal of data much of it is of limited value for the purposes of public " accountability." A review of the nature and operations of the consumer councils includes the criticism that they have no clear responsibility and that if they are to act as more than appeal organizations they must command adequate resources.

The conclusion is reached that the possibility exists that much of what the public really thinks and wants is overlooked. More imagination and experiment on the part of the boards is considered desirable. It is emphasized that the boards should look towards local contacts to dispel the feeling of remoteness that they engender in the public mind.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Ministry of Materials announces that **Mr. R. F. Rucker** has been appointed Director of Non-Ferrous Metals from 1st May next, in succession to **Mr. C. A. James** who has resigned his appointment as Director as from the end of this month.

Following a lunch given in his honour by directors of David Brown & Sons (Huddersfield), Ltd., on 14th April, **Mr. Harry Mellor,** works accountant, was presented with a gold wrist watch by Mr. David Brown, chairman and managing director, to mark Mr. Mellor's completion of fifty years' service with the company.

Mr. M. H. Adams, who has been chairman of the Boiler Availability Committee since its inception in 1942, retired from that position on 31st March. He is succeeded by **Mr. J. A. Vice,** O.B.E., who also has been a member of the Committee since 1942. Mr. Vice was formerly generation operation engineer to the British Electricity Authority.

Mr. J. A. Vice

Mr. C. H. Bradbury, M.I.C.E., M.I.Mar.E., M.I.Mech.E., chief engineer and technical director, Petters, Ltd., Staines, has been awarded the Percy Still Medal by the Diesel Engine Users' Association for the best paper of the current session. The title of the paper was "Torsional Vibration in Diesel Engines—Some Observations and Practical Aspects." The presentation was made at the Association's annual luncheon on 16th April.

Sir **Harry Pilkington,** deputy president of the Federation of British Industries, was elected president of the Federation at the annual meeting held on 15th April in succession to Sir **Archibald Forbes,** who has retired after holding the presidency for two years. Sir Harry Pilkington, who is chairman of Pilkington Brothers, Ltd., was until recently chairman of the F.B.I. Fuel & Power Consumers' Policy Committee, which was responsible for the F.B.I. evidence to the Committee on National Fuel Policy (the Ridley Committee).

Mr. Arthur Beckett, M.Inst.F., at present deputy station superintendent at Ribble generating station, has been appointed station superintendent of the New Roosecote (Barrow) station of the North Western Division of the British Electricity Authority, and takes up his position on 1st May. Mr. Beckett received his technical training at Preston Technical College and commenced his career with the Preston Corporation in 1926. Seven years later he became switchboard attendant at Ribble, and other positions held by him include control engineer, boiler house engineer, charge engineer and test and operations engineer. On 1st May, 1948, he was appointed deputy superintendent.

Mr. A. Beckett

Mr. B. C. Ward is retiring on 30th April from the position of district commercial manager for Bermondsey and Southwark with the London Electricity Board. Before vesting day he was borough electrical engineer and manager of the Bermondsey Council's electricity undertaking, a position he had held since 1938, after having been deputy borough electrical engineer from 1930. Mr. Ward was educated at the Brighton Grammar School and Brighton Polytechnic College, and had seven years with the Reason Manufacturing Co., Brighton. After short periods with other electrical manufacturers, he went to the Croydon Corporation electricity department in 1913, and from 1924 until leaving for Bermondsey, he held the position of distribution superintendent. For the past few

Mr. B. C. Ward

years he has been connected with the electricity supply industry's conciliation machinery, as chairman of the Bermondsey and Southwark Local Advisory Committee and, on alternate years, chairman of the Bermondsey and Southwark Works Committee.

Mr. T. A. O'Brien, public relations officer, Home Office, has been appointed public relations officer, General Post Office, in succession to the late Mr. Reginald K. Bacon.

The English Electric Co., Ltd., announces that **Mr. A. Mackenzie Parkinson** has been appointed sales manager of the company's domestic appliance division in control of home and export sales. Mr. Parkinson joined the company in 1946 on his release from wartime service with the Royal Artillery in which he held commissioned rank. He was a sales engineer for domestic appliances in the company's Manchester and Birmingham branch offices until 1948 when he came to London as chief assistant to the sales manager. Since 1950, Mr. Parkinson has been in charge of overseas sales of domestic appliances, during which time he has visited many overseas territories. Before the war, Mr. Parkinson was with British Insulated Cables, Ltd., the General Electric Co., Ltd., and Santon, Ltd. In making this new appointment, home sales and export sales for English Electric domestic appliances are combined in one department instead of two as formerly, with Mr. H. C. Timewell, manager of the domestic appliance division, retaining overall control.

Mr. A. M. Parkinson

The English Electric Co., Ltd., has appointed **Mrs. P. K. Burnie** to the demonstration team of the Domestic Appliance Division. Mrs. Burnie formerly worked in Putney with the London Electricity Board, and taught cookery and housecraft at both Isleworth and Wandsworth Polytechnic Colleges.

Mr. E. Butler-Henderson has been appointed a director of Richardsons, Westgarth & Co., Ltd.

Mr. H. R. Peters, general manager of Kerry's (Great Britain), Ltd., has been appointed to the board of the company.

Two new appointments are announced by E. K. Cole, Ltd., in consequence of the expanding activities of the Ekco Plastics Division. **Mr. W. A. Skellern** is to be sales office manager, and will operate from the London office and showroom at 5, Vigo Street, W.1. **Mr. H. W. Theobald** will be commercial office manager, and will be situated at the Ekco Works, Southend-on-Sea. Both appointments date from 1st May.

Mr. Leslie Gamage, vice-chairman and joint managing director of the General Electric Co., Ltd., who contributes an article to this issue, left London for South Africa on Wednesday last, accompanied by the Hon. Mrs. Leslie Gamage. Mr. Gamage, who is to attend the golden jubilee celebrations of the British General Electric Co. (Pty.), Ltd., will also visit Rhodesia, Swaziland and Portuguese East Africa, and is expected to be away for about three weeks.

Mr. D. T. Jones has been appointed general (sales) manager of G. S. Peckham & Co., Ltd.

Mr. R. F. Shearman has been appointed technical representative for Newman Industries, Ltd., in the United States and is leaving for New York on 20th April to take up his new appointment. For the past three years he has been mechanical development engineer at the company's Yate Works.

Mr. R. J. Shawyer has been appointed general manager of Newman Industries (Australia) Pty., Ltd., the recently established subsidiary company of Newman Industries, Ltd., Yate, Bristol. Mr. Shawyer, together with his family, left England on 10th April for Melbourne, to take up his new appointment. He was manager of the company's branch office at Manchester from 1946 to 1953. As we have already reported, **Mr. A. C. Coad,** formerly at the company's London office, has taken over the management of the Manchester office.

Mr. R. J. Shawyer

The annual dinner of the **Chief Technical Assistants' Association** was held at Kettners Restaurant, London, last Friday. The chairman of the Association, Mr. G. W. E. Gray, welcomed the chief engineer and some officers of the Southern Electricity Board and some guests from outside the supply industry. The speakers were Messrs. J. W. J. Townley and H. C. Wells, newly retired from the London Board, with Mr. H. C. Spence, deputy chief engineer (operations) and Mr. G. J. Moody, who are still with the London Board. The vice-chairman, Mr. E. H. Jesty, acted as toastmaster.

At the Paviour's Arms, Westminster on 14th April, a presentation was made to **Mr. H. C. Wells,** M.I.E.E., engineering adviser to the chief engineer of the London Electricity Board, who retired on 31st March after forty-five years' service. For forty years Mr. Wells

Mr. Wood making the presentation to Mr. Wells

was associated with the County of London Electric Supply Co., and associated undertakings, and was for many years the chief mains engineer. Sir John Dalton was among the 180 former County Co. friends and colleagues present. After speeches by Messrs. W. M. Booker, J. B. Robinson, J. A. Vice and W. J. Robb, Mr. W. J. H. Wood, former director and joint general manager of the County group, presented Mr. Wells with a radiogram. Although retiring from the supply industry, Mr. Wells does not intend to be idle as he is associated with an electrical firm.

Mr. E. Morgan, B.Sc., A.M.I.E.E., has been appointed senior liaison engineer, Components Division, of the Plessey Co., Ltd., Ilford, Essex. Mr. Morgan was lately an assistant to the superintendent engineer (transmitters) and assistant head, valve section, B.B.C. Engineering Division, and previously was a member of the technical sales staff in the Osram Valve Department of the General Electric Co., Ltd.

Mr. E. Morgan

As a result of the annual dance of the **E.I.B.A. Birmingham Branch** held at the Tube Investments Social Club, Oldbury, on 13th February, a sum of £276 6s 9d has been donated to E.I.B.A. funds. This is the highest total achieved in this area from the two major social activities held annually under the auspices of the Birmingham Branch.

OBITUARY

Mr. Frederic Pooley, M.I.E.E., a founder of Pooley & Austin, Ltd., electrical wholesalers, died on 19th April at the age of eighty-two, after a short illness. He retired from the chairmanship of the company in January last year, but retained a seat on the board. He celebrated his golden wedding anniversary last July. Mr. Pooley was educated at Liverpool University and received his training with the Liverpool Electric Supply Co. In 1890 he joined the National Telephone Co., Liverpool, being engaged on the erection and maintenance of switchboards, and in 1895 he was appointed local manager at Hastings. Two years later he joined W. T. Glover & Co. and in 1902 he was appointed London manager of the St. Helens Cable Co. Pooley & Austin was formed in 1907.

Mr. H. A. Lingard.—The death occurred on 18th April, at his home at Ewell, Surrey, of Mr. Herbert Arthur Lingard, who, until his retirement in 1948, was director of Lamps & Lighting Sales and a member of the boards of the British Thomson-Houston Co., Ltd., and other companies. He was seventy. After working as a pupil with Sir Alfred Haslam's Company, Derby, Mr. Lingard joined the B.T.H. Co. in 1904. Between 1908 and 1913 he worked with the Canadian General Electric Co. On returning to England he joined the B.T.H. Export Department and in 1928 became general manager of the Lamps and Lighting Department and three years later a director of the company. Apart from the posts he held with the B.T.H. Co., Mr. Lingard was a director of the Hotpoint Electric Appliance Co., a member of the Council of the Electric Lamp Manufacturers' Association (chairman on several occasions), and for many years a prominent member of the Illuminating Engineering Society. After his retirement he continued to serve the B.T.H. Co. in an advisory capacity.

The late Mr. H. A. Lingard

Mr. W. C. Eve.—The death occurred at Bournemouth on 19th April of Mr. Walter C. Eve, a former director of Standard Telephones & Cables, Ltd., and Kolster-Brandes, Ltd. He was sixty-six. The funeral ceremony took place at Bournemouth Crematorium on Wednesday.

PARLIAMENTARY NEWS

By Our Special Reporter

DURING the debate on the Budget proposals Mr. Godber, the Conservative member for Grantham, urged the Chancellor of the Exchequer to see if greater capital allocation could not be made for rural electrification. He said that much depended on this in extending mechanization and improving methods of agriculture. Electrification was playing an increasing part, and could play a vastly greater part in increasing food production.

Coal Supplies

Mr. Nabarro called attention to the price, the quality and the rationing system of household coal supplies. He said that whereas to-day electricity and gas remained unrationed and both were used for household heating purposes, solid fuel in the form of coal and coke was severely rationed, and the tendency had been, therefore, for an artificial demand to be created for electricity and gas for domestic space-heating.

Mr. Joynson-Hicks, the Parliamentary Secretary to the Ministry of Fuel and Power, replying, said it had been suggested that the electricity industry was consuming coal suitable for the household market. He had investigated this, and found that it had only 14,000 tons a year, an insignificant figure. He did not think it would be possible to embark on any scheme which would result in doing away with the allocation system for household coal until there were adequate supplies to ensure that people got what they needed.

Staffordshire Line Route

Mr. Snow asked the Minister of Fuel and Power if he would inquire into the circumstances in which a public inquiry into the routing of the Drakelow-Smethwick overhead line was delayed from May, 1952, when objections were first lodged by certain Elford, Staffordshire, farmers, to 8th January, 1953.

Mr. Geoffrey Lloyd said that the British Electricity Authority applied to him for consent to a compulsory wayleave on 18th December and the inquiry was held on 8th January. There was therefore no undue delay.

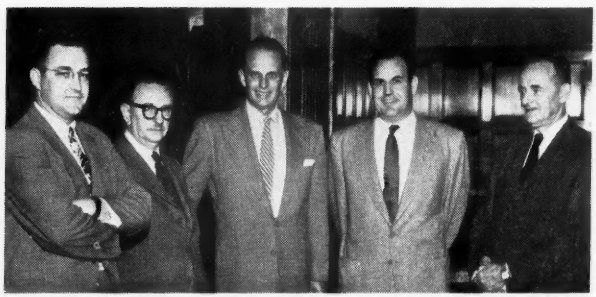
Mr. Snow asked the Minister if he was aware that although objections were lodged in May, between then and January work was begun on the indirect route to which objection had been taken.

Mr. Lloyd said he was not aware that work had been begun and he would make inquiries about it. He thought there was some confusion between objections made to the B.E.A. and the endeavours made to meet these objections. This went on between May and December, which was a normal process in negotiations between two parties.

Anglo-American Accord

RETURNING from their visit to Australia, Mr. F. G. Penny, chairman of South Wales Switchgear, Ltd., and Mr. A. J. Nicholas, director and general manager of the company, spent a day in Los Angeles. They were welcomed to the city by Mr. H. H. Mitchell, chairman of the Kelman Electric Co., and Mr. Floyd L. Goss, of the Los Angeles Department of Water and Power. The latter was a member of the American team which made a study of the British electricity supply system last year. The visitors were shown round the electrical system of Mr. Goss's undertaking and saw a new 500 MW station under construction: this plant will comprise two 100 MW and two 150 MW steam sets. All the equipment, with the exception of the control arrangements, will be situated out-of-doors.

By a coincidence, Mr. Goss was that evening giving an address upon his visit to the United Kingdom to the Power Division of the Los Angeles section of the American Institute of Electrical Engineers. Messrs. Penny and Nicholas were invited to attend and after Mr. Goss had concluded his address Mr. Nicholas was asked to comment on it, and expressed a very favourable opinion of Mr. Goss's survey. Then Mr. Goss presented a brief commentary, illustrated by many coloured slides, on the British people, country and conditions.



Left to right: Mr. J. W. Savage, chairman of the Power Section, Los Angeles Division, A.I.E.E., Mr. A. J. Nicholas, Mr. F. L. Goss, Mr. A. E. Cupon, vice-chairman Los Angeles Division, A.I.E.E., and Mr. F. G. Penny

Industry and the House

Varied Views on the Budget

By A. M. F. PALMER, A.M.I.E.E., M.P.

FOR a man with an academic background of distinction Mr. R. A. Butler is surprisingly undistinguished in speech-making. Apart from an occasional small spark of irony his phrases are commonplace and his style in general "company meeting." But nobody who witnessed it can doubt that the Chancellor's Budget statement was a remarkable Parliamentary occasion. There was none of the political bounce of a Dalton, the moral feeling of a Cripps or the economic intellectualism of a Gaitskell, but the atmosphere of intense practical application was overwhelming. Mr. Butler is a perfect exponent of solid middle-class commonsense and well knows the strength of that position in British public life.

Delayed Judgment

All peacetime Budgets at the moment of opening them seem to contain more asking for praise than deserving of blame; it is a poor Chancellor who cannot find some sparkling sugar to coat his bitter pills. It is only later that the value and merit of a Budget is successfully judged, aided by a process of crystallization of expert opinion and grouping of party argument. Hence during Mr. Butler's actual speech on Budget day the Opposition Members preserved a quiet which their delighted opponents described as "glum," but which more likely was the experienced caution of men and women knowing how to those in their position the waiting game usually scores goals in the end.

But it would be ungenerous not to compliment the Chancellor of the Exchequer on a very clever piece of work. Certainly his back benches did not flag in the generosity of their applause. When Mr. Butler resumed his seat the solid wall of Conservatives behind him waved scores of folded order papers plus three top hats for good measure.

To turn to the content of the 1953 Budget: everybody in industry—and for that matter almost everybody in the Commons—will be glad to see the end of the excess profits levy from 1st January next year. Business and the Conservative Party have always regarded the levy as one of Mr. Churchill's less thoughtful electoral commitments and bad in principle. The T.U.C. and the Labour Party, while having, of course, no objection to the principle of taxing high profits, have argued from the start that this particular method penalized industrial efficiency.

Nor is there much difference between the Government and the Opposition on the Chancellor's decision to grant again initial allowances to industrial firms for expenditure on plant and machinery. Mr. Gaitskell in his capacity as leading critic of Mr. Butler said that the dropping of the E.P.L. and the restoration of the initial allowances were "the two things done which have our approval." In fact on this point he was rather like the courtiers of old, "more royalist than the king." Why had the Chancellor "limited the restoration to 20 per cent," complained Mr. Gaitskell, "Why not put the allowance back to the full 40 per cent?"

Economic Outlook

As I write, the Budget debate is still to be concluded, but from the trend of some of the informed and serious speeches made it is evident that not all are prepared to take the 1953 economic "new look" with quite the uncritical "It was roses, roses all the way" attitude of the general Press. The export position appreciably hardens against us, production remains obstinately below the figures of a few years back, unemployment slowly grows, rearmament remains to be paid for, point out these critics: can this, therefore, be a time for private relaxation and free enterprise go-as-you-please? Messrs. Gaitskell, Wilson and Albu, who have put this view as ably

as most, in short doubt the capacity of post-war Britain to win through if there is to be a full-blooded return to traditional commercial and monetary assumptions.

Let Mr. Butler's candid friend Mr. Ralph Assheton answer them: "The Chancellor has undoubtedly taken some risks. . . . More than half the concessions have to be paid for in future Budgets. Do not let us forget that. These risks will be justified only if he succeeds. I think he will succeed, as indeed he must, in further reducing expenditure and giving every incentive he can to saving. He has paid more attention in this Budget to the needs of trade and of industry, and that benefits every man, woman and child. We thank him for what he has done; we trust he will do more next year."

The Budget purchase tax concessions will help the electrical industry in a number of directions. Radio batteries will not be taxed at all in future; radio and television sets, refrigerators, vacuum cleaners, washing machines and electric goods vehicles all gain a little in one way or another.

Readers of these columns will know that I make it my business to comment regularly on the activities of the anti-electricity forces in the House and to expose when I can their fallacies and prejudices. Well, hounds were out again on Wednesday night. Mr. Nabarro speaking this time of domestic coal supplies on the Adjournment took more than a few minutes from his restricted time for a few familiar side snarls at electric space and water heating. This "wasteful" use of electricity, he alleged, had been vastly inflated by a shortage of domestic solid fuel. He contended that if coal was placed on a free market there would be a "substantial diminution" in the consumption of electricity for space heating. Since he had also remarked a few moments before that coal de-rationing would *not* mean any "very great" increase in demand for the accommodating mineral, because it was now too expensive anyhow, his contention seemed a little hard to understand.

As the Parliamentary Secretary to the Ministry of Fuel and Power (Mr. Joynson-Hicks) cogently remarked, Mr. Nabarro was advocating that about five million tons of coal be diverted "to be consumed in the most inefficient way known to the fuel efficiency experts at the present time, and divert it at the expense of electricity and gas which are admittedly efficient methods of consumption."

"These Unfounded Allegations and Criticisms"

"*Sunday Express*" *Apologizes*

THE following statement appeared in the *Sunday Express* of 19th April:—

"In earlier issues the *Sunday Express* has commented upon the appointment of Mr. Briggs as Controller of the Merseyside and North Wales Division of the British Electricity Authority.

"On Sunday, February 1, reference was made in the column 'Current Events,' written by Mr. John Gordon, to the absence of any open criticism of this appointment in the nationalised electricity industry and of any discussion of it in the Trade Press, and it was suggested that this was because Lord Citrine was the sole dispenser of jobs in the industry and almost the sole dispenser of advertising.

"These statements were not in accordance with the facts.

Amicably Settled

"The British Electricity Authority and Lord Citrine take the view that the passage referred to, read with other comments in the *Sunday Express*, also implied that Mr. Briggs was appointed for political reasons. They commenced an action for libel. This action has now been amicably settled.

"The *Sunday Express* and Mr. Gordon recognise that any suggestion that Lord Citrine uses his position as Chairman of the Authority to stifle criticism within the industry or in the Trade Press or that Mr. Briggs was appointed for political reasons and any suggestion that the British Electricity Authority permitted such a situation to exist were entirely unwarranted and that the comments based upon the mis-statements made were quite unjustified and should never have been made.

"The *Sunday Express* and Mr. Gordon desire to express to Lord Citrine and the British Electricity Authority their regret for the publication of these unfounded allegations and criticisms, and unreservedly withdraw them.

"They will pay an agreed sum to meet the expenses incurred in the action and to make a contribution to the Electrical Industries Benevolent Association."

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Tax on Immersion Heaters

AFTER the elation and emotional relief aroused by the "incentive" Budget, there comes calm assessment. It is a "lazy" Budget. A wholesale reduction of 25 per cent is so much easier than giving consideration to wholly justified claims for considerably greater reductions or complete abolition of purchase tax imposed on particular items.

The 100 per cent purchase tax was originally imposed on electric immersion heaters in order to restrict the sales and to relieve the load on the electrical generating plant. This reason no longer exists and has not existed for some considerable time. The Electricity Boards have become seriously concerned with the fall in the sale of electricity and as an alternative to a wholesale increase in charges have themselves made representation to the Chancellor for the complete abolition of purchase tax on this class of apparatus. It would appear that the Chancellor does not take notice even of his Government's own technical advisers. Is he aware of the illogical and unjustified inclusion of an electric immersion heater in the "luxury" class?

Bedfont, Middx. A. J. WYNDHAM ROBERTS

Electricity Supply in Europe

WE have been following with great interest the attention given by the *Electrical Review* to the work of this Organization concerning electricity supply developments in Europe:

(*a*) 3rd October, 1952, page 734, "Electrical Geography: International Power Exchanges."

(*b*) 6th February, 1953, page 293, "European Co-operation: Electric Power Prospects."

(*c*) 20th March, 1953, page 656, "European Electricity Supply: Forecast of the Position in 1956."

(*d*) 27th March, 1953, page 665, "Electricity Supply in Europe."

In your issue of 27th March (second par., page 665) it is stated that earlier O.E.E.C. studies (*Electrical Review*, 3rd October, 1952) support ". . . the view that any considerable extension of transmission systems would not, for the present purpose, compare in most cases economically with the construction of new power stations locally."

There would appear to be some confusion here, for the 3rd October article deals with documents issued by the Economic Commission for Europe (E/ECE/EP/126, 128 and 151) and not with any O.E.E.C. study.

The distinction regarding authorship is important, as the O.E.E.C. Electricity Committee is still considering how much new plant would be required while making the best use of the possibilities offered by the reinforcement of European regional interconnection.

As you rightly pointed out, the problem is an economic one and its solution is conditioned by the pattern of European investment and the time factor.

Paris. A. M. TSIRIMOKOS,
Head of the Electricity Section,
Organization for European
Economic Co-operation.

Steel Distribution

IN the House of Commons on Monday the Minister of Supply stated that despite the increase in steel plate production there was likely to be a marginal shortage for some time to come. After discussions with the steel industry it had been decided to introduce a steel-plate distribution scheme to be operated on voluntary lines by the industry itself with guidance from the Government. An Inter-Departmental Committee composed of officials of the Government Departments principally concerned had been set up. Its task would be to keep under review the needs of the plate-using industries and to consider any adjustments in the pattern of production and deliveries which might be desirable.

VIEWS on the NEWS

By REFLECTOR

THE Chancellor's decision to close a taxation " loophole " in the Scilly Isles has caused some perturbation there and the sending of a deputation to Mr. Butler is contemplated. In reporting the composition of this deputation the Hughtown (Scilly) *Manchester Guardian* correspondent mentions that one of the deputed is Councillor E. Sidney, " managing director of the company that makes electricity here —the only electric supply company, they say, beyond the region of the British Electricity Authority." This is apparently the St. Mary's (Scilly) Electricity Supply Co., Ltd., which has a 552 kW plant serving a population of 1,250 in a six-square-mile area. But the undertakings of the Isle of Man Electricity Board and the Douglas Corporation are also beyond the " region " of the B.E.A.

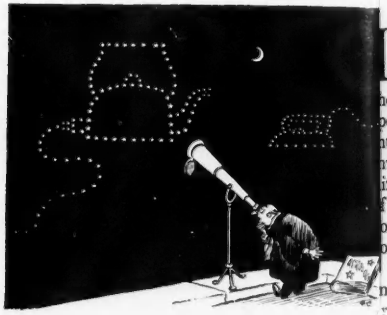
* * *

Electricity authorities must be heartily sick of fish. They have to take special steps to ensure that the creatures do not get mashed in the blades of hydro-electric turbines; that they are not parboiled by cooling water effluent; and that they do not block water intakes. Now the Midlands Electricity Board has been tackled by an owner of tropical fish who points out that if the temperature of his electrically-heated tank falls seriously below 70 deg F the fish will not survive. He asks, therefore, that the changing over of his installation from d.c. to a.c. shall be expedited and the Board has been " helpful and sympathetic."

* * *

The reviving interest in electrical development is being manifested in many directions but who would have thought the astrologers would be concerned? In " The Stars and You " in the *News of the World* of 12th April there appeared the following:—

> " Wednesday—You can go ahead with financial arrangements, make investments, take out new insurance. Consider advantages of new electrical apparatus . . ."



Even the stars in their courses are apparnably on our side.

* * *

The Department of Scientific and Industrial Research has angered Mr. Thomas Johnston, the chairman of the North of Scotland Hydro-Electric Board, by suggesting that brick or concrete construction was cheaper in Scotland than stone. He points out that the Board built its Kirkwall station of stone at a cost much lower than the lowest tender for brick construction. In the case of the Luichart station the figures were about equal. Cost is most important, of course, but how much is gained æsthetically by the use of native building material.

* * *

Laments from dwellers in country districts that townspeople are being supplied with electricity while they are forced to wait in vain are very common. It is unusual to come across the opposite of this as I have done. A Dumbarton resident states that he is one of 60 people in the town's principal street who have been trying for four years to get electricity installed. He says the news that the S.W. Scotland Electricity Board has connected its 2,500th farm fills him with envy and he wonders how many more farms will get power before the Board can spare the 60-odd yards of cable required to supply " we unfortunate town dwellers."

Engineering in Europe

Survey of Current Literature

IN Italy winds and seismic shocks are very real dangers to the many transmission lines bridging alpine passes and arms of the sea (in one of the world's seismic danger spots). The vibration safety of the towers must therefore form an important object for investigation and it is admittedly a very difficult one, since the theoretical treatment of vibrational strength problems is not yet conclusive, least of all in the case of a composite structure like a trellis mast.

The author's tests on models of masts (model scale 1 : 25) on a vibrating table are therefore very instructive, although the author himself does not claim that they permit the behaviour of actual towers in resonance conditions to be predicted. However, an important indication in this respect was obtained, viz. that despite the low value of the damping factor of the structure (2 per cent) the amplification of the amplitudes applied at the tower base was not higher than 7 in resonance conditions. It should be noted that this result was obtained without occurrence of plastic deformation of the material (which would be unavoidable at higher vibration amplitudes). Such plastic deformation would actually, and considerably, increase the damping, and therefore the vibrational strength, of the material of the tower.—" Experimental Investigation of the Influence of Damping on the Vibration of Overhead Line Towers," L. Finzi, *Energia Elettrica*, Vol. 29, No. 11, pp. 685–690, November, 1952, in Italian.

Heating Calculations

The difficulty in calculating the heat transfer in convection heaters, even in the case of a useful approximation, is due to the complicated form of the elements and the indeterminancy of the degree of turbulence of the air flow. There remained therefore only the experimental approach, based on the design of an experimental heater with forced-draught circulation and working in a closed loop (through a pipe system containing a flow meter). The experimental circuit had also to contain a shutter arrangement for air-speed control (5–20 m/sec) and damping tubes for absorbing the transverse pulsations of the air flow set up by fan and shutters.

The measurements were made at temperatures of the air flow between 100 and 200 deg C, the heater temperatures being 300–500 deg C. The heater elements themselves were of band and wire types, inserted into seven frames arranged behind each other in the flow direction. The coefficient of heat transfer was so obtained for straight and spiral-type elements of wire, and band shape as a function of air speed and equivalent wire and band elements could be determined. The heat transfer coefficient is almost independent of specific heat emission (watts dissipated per cm^2) and, in the case of spiral-type elements, of the pitch of the helix. Similar measurements were also made on elements placed across the air flow. The results enable the permissible specific loading of the elements to be determined.—" Calculation of the Heater Elements of Electric Convection Heaters," A. D. Svenchanskii and S. A. Malyshev, *Elektrichestvo* No. 11, pp. 53–55, 1952, in Russian.

Transformer Flux Influence

The influence of the leakage fluxes on the magnitude and character of the fluctuations of the true magnetic flux in core limbs and yoke of a transformer is investigated. The theoretical analysis yields only qualitative results. When the reactive energy flows in an actual transformer from the outer to the inner winding, the centre of the core limbs is partly relieved from the flux, whereas the yoke is under full magnetic load, conditions being reversed for the opposite direction of the energy flux. The flux in the core is then determined by the primary voltage of the inner winding.

An equivalent circuit taking into consideration these facts shows the leakage reactance X_r in series with the reactance

of magnetization X_m and the corresponding vector diagram enables the relative decrease of the flux in the core to be determined. The consideration is then extended to include transformers of finite thickness of the winding, and the general cases of transformers under load with two and three windings and with divided windings.

The experimental investigation confirmed the theoretical results which may be summarized by the statement that the secondary voltage of a transformer can be controlled by the magnetic flux during the period in which the energy flow is from the outer to the inside winding, within the limits of the reactance voltage, and without an increase of saturation, temperature rise in the core and core loss beyond the rated values.—" Fluctuation of the Magnetic Flux of Transformers with the Changes in Direction, Magnitude and Phase Relation of the Energy, and under Voltage Regulation," B. Heller, J. Chladek and S. Matena, *Elektrotech. Obz.*, Vol. 41, No. 11, pp. 506–515, November, 1952, in Czech.

Cable Protection

One of the main problems of the overload protection of cables by fuses is the mutually opposing requirements of " safety " ratings of the fuses and of economic utilization of the cable, since mostly the differences between an economic current loading of the cables and what the V.D.E. regulations call the " upper testing current " (1·6 rated fuse current) are not very large. This " upper testing current " which should melt the fusibles inside two hours is therefore regarded as an overcurrent. The " rated " fuse current, in any case, is considerably lower than the permissible and economic load current of the cables protected by such fuses.

The well-known and proven NH type of fuse was, among others, designed for the purpose of satisfying these differing requirements of safety and economy and succeeded in this by a combination of meticulously arranged and cross-linked fusible conductors with solders which at a certain temperature suddenly attack and quickly destroy a silver link inserted in the fusible conductor. One main advantage of these fuses is that, apart from the fine grading of the value of the adjustable limiting current, the melting of the fuse links occurs at the lowest possible temperatures, the heat dissipation being almost perfect, so that no fire risks are incurred. In view of the existence of this fuse type, the main problem of overload protection seems now to be more one of the definition of fuse and overcurrent ratings than one of actual protection.—" Basic Problems of the Overload Protection of Cables by Fuses," A. O. Muller, *V.D.E.-Fachber.*, Vol. 16, pp. II/13–16, 1952, in German.

New Impedance Relay

Impedance relays of the usual type employed for distance protection are not sensitive enough to permit of operation with single-phase automatic reclosing of long lines and if their sensitivity were increased the transmission of large powers would become impossible. These and other valuable data were obtained by a detailed analysis of the operation of protective relays by circle diagrams. On the basis of this analysis a new type of directional impedance relay for long 220 kV lines was designed, the starting resistance of which does not remain constant, but varies with the phase difference between voltage and current supplied to the relay. These relays, known as the ISKH type, are built in two models, for the sending and receiving ends of the line, the linear characteristics of which differ by their angle of slope. The relays have one voltage and two current windings, one of the latter being the polarizing and the other the working winding. The phase shift between polarizing and working flux is obtained by two massive short-circuited turns.

The possibility of relay operation in response to current differences is assured by the sub-division of each winding into two sections connected in parallel. The use of ISKH type relays on a 220 kV line of 200 km length enabled the current transmitted to be increased from 550 to 1,200 A and the protection to be made independent of current oscillations in three-phase as well as single- and two-phase conditions.—" Blocking Relays for Improving the Protection of Long 220 kV Lines," M. F. Melnikov, N. V. Chernobrovov and P. D. Chernyaev, *Elekt. St.*, Vol. 23, No. 10, pp. 48–51, October, 1952, in Russian.

Readers who require accurate full translations of any of the articles abstracted in this section can be put into touch with the translators who will supply them at current rates. —Editors, *Electrical Review*.

Automatic Winding in Mine Shafts

Control Arrangements Discussed at I.E.E. Utilization Section Meeting

DURING the last twenty years the electric winder has developed a marked ascendancy over the steam winder, and it is the declared policy of the National Coal Board to electrify all the remaining steam winding plant as fast as the opportunity arises and the material and generating capacity become available.

Electric winding provides a degree of supervisory control and protection difficult to obtain with the steam engine. Although much has already been achieved with the electric winder, modern developments in control technique should enable an even higher degree of safety to be obtained. In view of the fact that men are wound up and down the mine shafts of Britain every working day the number of fatal accidents is happily low; nevertheless, 57 men were killed and 156 seriously injured in winding accidents from 1940 to 1951.

In a paper prepared by Messrs. B. L. Metcalf and G. Cuttle (both of the National Coal Board) which was presented at a Utilization Section meeting of the Institution of Electrical Engineers in London last week, a review is made of electric winder characteristics and winding practice with particular reference to the degree of control required for satisfactory automatic winding. The authors also consider the shortcomings of equipments not fitted with means of effecting complete safety/load compensation and controlled electrical retardation.

The degrees of automatic control are defined, together with those requirements of a winding engine, which is essential to satisfactory control. How these requirements can be achieved with both Ward Leonard and a.c. equipments by incorporating the latest developments in control technique is suggested, and results of tests made on automatic winders in France are quoted. Having reviewed the problems of control the paper outlines the automatic winding applications showing how control can be effected for both skip and cage winding and the advantages to be derived.

The authors conclude that, provided improved control technique gives the hoped for results, the introduction of automatic winding with control from bank and the resultant simplification of operation should considerably improve operational efficiency, particularly where large outputs are to be obtained from our new combined mines. In view of this, they look to the electric winder manufacturers to take up the challenge and produce the equipment to make the winding shafts in this country the safest and most efficient in the world.

DISCUSSION

Mr. E. H. Browne (Director-General, Productivity Department, National Coal Board) opened the discussion by saying that from the safety and economy aspects automatic winding must come, and would reduce the winding hazard. The operation of cages from within the cage must also be considered, particularly for staple shafts. By putting the whole equipment under one man the accident hazard could be greatly reduced. The statutory regulations would keep pace with these needs, if the safeguards necessary were introduced by the electrical engineer.

Dr. E. Friedlander (G.E.C.) described a speed control scheme for an a.c. winder motor with a performance similar to that of a Ward-Leonard-controlled d.c. motor. A small machine called a control generator was put on the shaft of the main winder motor, being excited by a.c. when the winder motor was on driving and by d.c. when it was on dynamic braking, and giving automatically an adjustment of the rotor resistance proportional to slip on driving and speed on dynamic braking. No difficulties had been experienced with a scheme on these lines which had been installed in South Africa.

Mr. A. E. Crook (N.C.B.) pointed out that with present winding systems they had manual control of the engine and an automatic mechanical contrivance which

limited the speed to a safe value and cut off the power supply in the event of abnormal speed. There was much to be said for retaining that contrivance as a second line of defence, even with automatic winding.

Mr. T. H. Petch (B.T.H.) said that the first automatic winder with which he was acquainted had been supplied to Australia in 1929. Their first attempt at closed-loop winding had been on two 1,850 h.p. Ward-Leonard equipments supplied to South Africa in 1936. Their next closed-loop winder was a 2,760 h.p. Ward-Leonard equipment supplied to South Africa in 1949–50, which gave early experience of the use of amplidynes and incorporated acceleration control which permitted the driver to move his control lever directly from the off position to full speed, the acceleration being then controlled for him. To gain experience, a number of closed-loop a.c. winders with manual control were now being built, amplidynes being used for the amplifiers. He had seen some of the French automatic winders, and thought that they led the world both in excellence of control and neatness of execution. All that British manufacturers were waiting for was the orders.

Mr. J. D. Moreton (Siemens-Schuckert) contended that the Ward-Leonard approach to the automatic winding problem involved so much capital cost, as well as expensive maintenance, that a.c. winding using conventional three-phase equipment seemed to be more attractive. Not only was the capital cost less but the overall efficiency was much higher and maintenance costs were lower and more standard equipment could be used.

Mr. D. R. Love (Metro-Vick) said that Mr. Browne was interested in knowing how far manufacturers could go toward meeting the requirements laid down in the paper. They could go all the way now, and in saying that he thought he spoke for all the manufacturers in this country. He questioned the value, however, of going to full automatic control. The South Africans had tried it on several occasions and had come back to the idea of semi-automatic or supervisory manual control. He agreed that cage control was a desirable feature, and believed that one Australian mining concern was trying a form of radio control from the cage. He also agreed with Mr. Petch that British electrical firms were simply waiting for the orders.

Mr. E. Loynes (N.C.B.) maintained that to determine the sort of automatic equipment or degree of control required it was essential that the degree of speed control, acceleration and retardation control and so on should be specified. The fundamental approach must be to determine the boundary conditions of the problem, and he looked forward to a further paper which would tackle the quantitative side of the subject.

Mr. A. J. Riches (English Electric) described a semi-automatic skip winder which, he said, complied with many of the authors' requirements. By the use of a control exciter set any prescribed rate of acceleration and retardation could be attained with ease, and acceleration cams, unlatching gear, spring links and the like were unnecessary.

Mr. P. N. Wyke (N.C.B.), referring to the fact that there had been 57 fatal winding accidents in 11 years, suggested that many of these must have occurred on steam winders, where there was hardly any control at the end of the wind. If they carried on as at present, slowing down the winder at the end of the wind and replacing steam winders, the accident rate would come down.

Mr. O. T. Evans welcomed the paper as a sign that the Coal Board was at last considering the advantages of automatic winding, which the manufacturers had been recommending for twenty years. Any specification put forward by users, however, should be concerned with operational characteristics, so as not to restrict progress; the means were a matter for the manufacturers. He suggested that on a winder the basic control requirements were speed and torque control. Retardation and acceleration control might be added as optional extras, depending on whether one was coal-winding or man-winding.

Mr. G. Cuttle, in reply, described the discussion as most encouraging and felt it would not be long before the orders which had been referred to were forthcoming

Street Lighting Luminaires

A case study data on productivity and factory performance in the manufacture of street lighting luminaires in the United States is now available from the British Institute of Management, Management House, 8, Hill Street, London, W.1, price 5s. The report has been prepared by the United States Department of Labour.

Machining Hard Metals

The Spark-Cutting Process

THE increasing use in industry of hardened steels and sintered tungsten carbides, and other similar materials which are exceedingly difficult to fabricate, has created increased interest in the machining of these materials by electric spark methods. Apparatus suitable for industrial applications has been developed in Russia, America and England. This type of equipment has a number of advantages over conventional machining methods. The tool, or electrode, is not in physical contact with the material which is being shaped and so there is no working pressure. It is therefore possible to have simpler holding devices to secure the necessary rigidity. The erosion of the metal does not depend on heating and so deleterious effects, which might result from the use of ordinary methods, are avoided. A disadvantage is the slow rate of material removal, usually about 1 gramme per minute, which makes the method economic only for exceptionally hard materials.

It is claimed that the machine used for the American "Method X" will carry out all machining operations.[1] It has a base like that of a drill press or jig borer, an electrode feed and control mechanism, and power supply. The work-table can be moved laterally and longitudinally, or can be rotated completely for the purpose of aligning the work.

The electrode movement is controlled by an amplidyne and associated circuits in such a way that optimum cutting speeds for a given condition are maintained; 220 V 60 c/s a.c. is used and the peak demand is 7 kW. The cutting operation is carried out under a dielectric fluid such as paraffin, fuel oil, or a special compound which, it is claimed, speeds up operation.

British Method

The corresponding British process, operated by Sparcatron, Ltd., of Gloucester, is the subject of patents by that company both in Great Britain and America.[2]

Three-phase a.c. is transformed and rectified and used to feed a bank of capacitors which can be connected up in various ways to furnish the capacitance required for the particular operation. The hollow electrode, which is negative, is held in a chuck through which the dielectric fluid, used to cover the workpiece during machining, is introduced, the fluid then flowing down inside the electrode into the tank which forms the work-table. The fluid is then pumped back through a filter, which removes stock, to a reservoir for recirculation. The electrode is fed to the workpiece by a servo-motor through a rack and pinion. If the electrode moves from its correct position, sensitive control devices will carry out the necessary adjustment automatically, whether the workpiece is stationary or rotating.

Applicable to Conventional Machines

The process can be adapted to conventional machines such as a universal grinding machine, in which case the current supply to the electrode and the work is taken through slip rings and suitable brush gear. Dielectric fluid is directed over the work and the electrode from a circulatory system. The electric circuit can be varied to give different surface finishes.

Various explanations of the spark-cutting process have been put forward, one by Rudorff[3] in which the disruptive quality of the spark is emphasized. The spark represents a sudden breakdown of the dielectric separating the electrodes, which is caused by the formation of ions by an electric field of high intensity. It is thought probable that the oscillatory mechanical forces which are produced by the spark cause the metallic surface to disintegrate into fragments.

The physical background of the process has also been investigated by Williams in America.[4] He found that typical spark discharge rates were from 50 to 5,000 a second. The detached fragments are removed by the flow of dielectric liquid due to the explosions, or removal may be accelerated by forced circulation of the

fluid. In the spark process erosion is greater at the positive electrode, while in arc-cutting processes erosion is greater at the negative electrode. Arc erosion is accompanied by high temperatures and melting, but in the spark process microscopic examination reveals evidence of fracture by mechanical forces. Analysis of residues of tungsten carbides after machining does not provide evidence of chemical changes resulting from high temperatures or melting. The hypothesis is therefore advanced that erosion is caused by electric field forces resulting from the extremely high current density, at, and just near, the point of erosion, giving a high electric field gradient and force on the positive ions of the crystal lattice.

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Swiss Electrical Imports

Increased German Participation

A FEATURE of Switzerland's import trade in electrical goods last year was the advance made by Germany in most groups. Total imports of dynamo-electric machines, unspecified electrical apparatus and meters and measuring instruments showed appreciable increases on 1951. Those of wire and cables (which fluctuate considerably from year to year) amounted to fr. 3,676,000, or more than double the 1951 figure, and Germany captured over a third of the business; France came next and Great Britain's share was about 10 per cent of the whole. Exports of wire and cables totalled fr. 2,832,000 compared with fr. 3,133,000 in 1951.

The attached statement shows the chief items last year with increases or decreases on 1951. (12–12½ Swiss francs = £1.)

Class of Goods	1952 Sw. fr. (000)	Inc. or dec. on 1951 Sw. fr. (000)
Accumulators	2,217	— 161
From United States	723	— 100
„ France	113	— 367
„ Sweden	273	+ 58
„ Germany	574	+ 97
„ Great Britain	418	+ 139
Insulators	1,625	— 1,109
From France	120	— 65
„ Denmark	1,360	— 874
„ Germany	66	— 130
Meters and measuring instruments	6,909	+ 2,329
From United States	2,643	+ 897
„ Germany	1,952	+ 536
„ France	368	— 101
„ Great Britain	657	+ 186
„ Holland	895	+ 700
Telephone and telegraph apparatus	4,125	— 21
From Belgium	2,652	— 8
„ Great Britain	55	— 40
„ Germany	1,045	+ 149
„ United States	55	— 132
Radio apparatus	20,424	+ 303
From Great Britain	2,836	+ 925
„ Germany	7,547	+ 1,309
„ Holland	3,184	— 853
„ France	1,307	+ 275
„ United States	3,945	— 471
„ Sweden	221	— 422
Glass rectifiers	145	— 43
From Holland	49	— 42
„ Germany	41	— 2
Unspecified electrical apparatus over 500 kg.	574	+ 417
Unspecified electrical apparatus, 50 to 500 kg.	1,314	+ 411
From Germany	655	+ 259
„ Italy	158	+ 18
„ Great Britain	97	+ 18
„ United States	183	+ 21
Ditto, 3 to 50 kg.	1,489	+ 196
From United States	356	+ 115
„ Germany	474	+ 233
„ Italy	56	— 79
„ Great Britain	140	+ 24
Ditto, under 5 kg.	3,786	+ 433
Dynamo-electric machines	15,657	+ 6,608
From Italy	1,107	+ 550
„ France	401	— 139
„ United States	2,387	+ 562
„ Germany	8,192	+ 4,338
„ Great Britain	1,154	— 131
Lighting and starting equipment for vehicles	4,667	— 1
From France	525	— 88
„ United States	1,583	+ 61
„ Germany	1,560	— 28
„ Great Britain	534	— 60
Electric incandescent lamps	4,605	— 1,596
From Germany	550	— 248
„ Holland	2,448	— 542

Digital Computers

I.E.E. Measurements Section Papers

At a Measurements Section meeting of the Institution of Electrical Engineers in London last week, four papers were presented dealing with various aspects of automatic digital computers.

In the first, by Dr. T. Kilburn (Manchester University) and Messrs. G. C. Tootill (Military College of Science), D. B. G. Edwards (Manchester University), and B. W. Pollard (Ferranti, Ltd.), the new universal high-speed digital computing machine now working at Manchester University is described. It has a high-speed storage capacity of 10,240 binary digits and an intermediate storage capacity of over 280,000 binary digits.

Its other features include a completely automatic transfer system between the two types of store; a B-tube which allows instructions to be modified in a much shorter time than by normal accumulator use, thus facilitating the programming of iterative processes; and a fast multiplier which carries out a multiplication in the same order of time as the normal addition or subtraction operations. Input and output operations in this machine utilize normal 5-hole teleprinter tape. Input is by way of a photoelectric reader and output can occur either from a tape punch or a teleprinter, or both can operate together. The method of maintenance and also some reliability figures are given.

Details of the design and construction of the above machine are given in the paper which was subsequently presented by Messrs. B. W. Pollard and K. Lonsdale (both of Ferranti, Ltd.). The constructional techniques adopted for the electronic equipment, the cathode-ray tube storage units and the magnetic storage drum are described, and an outline is given of the design procedures adopted for the electronic circuits. The techniques used to obtain reliability and ease of maintenance are particularly stressed. The development of suitable maintenance procedures for the operation of the computer continuously over periods of five days in each week is discussed, and details are given of the performance of the computer over a period of 61 weeks.

In the next paper, which was presented by Dr. T. Kilburn and Mr. G. Ord (both of Manchester University), three methods are described of storing decimal digits, which are extensions of the well-known method of storing binary digits using a cathode-ray tube store. It is shown that one of these methods, which uses ten separate but small elements of the cathode-ray tube screen, provides the best compromise between speed of operation, digit storing capacity and reliability.

A complete serially controlled cathode-ray tube store holding 32 words of 8 decimal digits has been operated successfully. The digit period was 40 microsec, and could be conveniently reduced to 30 microsec if desired. These results compare favourably with those for the binary store used in the Manchester University computing machine. In the appendix it is shown that the preferred decimal system may be derived from a new binary system of storage.

Cathode-ray Tube Storage

The final paper dealt with recent advances in cathode-ray tube storage and was presented by Professor F. C. Williams, Dr. T. Kilburn, and Messrs. C. N. W. Litting, D. B. G. Edwards and G. R. Hoffman (all of Manchester University). This paper is essentially in three parts. The first deals with current practice at Manchester University and in particular with modifications to the defocus-focus system of storage and the signal amplifier. The second part deals with experimental work directed towards the clarification of the mechanism of storage, while the third expounds a qualitative theory based on the experiments described in the second.

It is concluded that storage operation may be theoretically explained by drawing an analogy with a triode valve; the collector, the bombarded spot and the surrounding screen surface being analogous to the anode, cathode and control grid, respectively. For technological purposes the original theory may well be sufficient, and it is shown that it can be used to predict storage results.

COMMERCE and INDUSTRY

Purchase Tax Changes

American Policy on Overseas Tenders

FOLLOWING Mr. Butler's Budget speech the Commissioners of Customs and Excise have issued Notice No. 78F announcing that from 15th April the 100 per cent rate of purchase tax is to be reduced to 75 per cent, the 66⅔ per cent rate to 50 per cent and the 33⅓ per cent rate to 25 per cent. It is also announced (*inter alia*) that batteries and accumulators suitable for use with wireless receiving sets of the domestic or portable type (formerly chargeable at 33⅓ per cent) are now exempted from tax, as are the chassis of electrically propelled goods vehicles, which were also chargeable at 33⅓ per cent.

English Electric American Tender

We reported in our issue of 12th December last that the English Electric Export & Trading Co., Ltd., had submitted the lowest tender (in competition with leading American concerns) for a contract to supply four 60 MW generators for the Chief Joseph Dam at Bridgeport, Washington, United States. Owing to the change of administration which took place about that time the decision on the tenders was left to the new Secretary for Defence (Mr. Charles Wilson). It was reported from Washington, D.C., last week that Mr. Wilson had proposed that the Department of the Army, which is responsible for the Chief Joseph plant, should reopen the tendering, either on the old specifications or new ones. American opinion is that either way the English Electric bid will be rejected because American concerns will now be able to quote prices nearer to those of the English Electric on the original specifications or new specifications will be such as to make it difficult for English Electric to quote.

The *Manchester Guardian* says that pressure has been brought to bear upon the Defence Department by the National Electrical Manufacturers' Association which, in objecting to such contracts going abroad, questioned whether there could be adequate maintenance and repair service for British plant. To this the English Electric Co. is said to have replied that three Canadian firms were available to provide repairs and services in the event of war. The State Department is said to have been in favour of awarding the contract to the British company in view of the substantial saving in cost.

The matter was referred to by the President of the Board of Trade (Mr. P. Thorneycroft) during the Budget debate on Monday. He said they had been surprised and disappointed to hear the news. There was more involved than the award of a £6 million contract. The treatment and eventual outcome of this case must be regarded as in some way a pointer to future American commercial policy.

Electric Vehicle Exhibition

Further evidence of the enterprise and initiative of the Surrey Sub-Area, South Eastern Electricity Board, was provided last week by the holding of its third electrical exhibition at its offices at Rough Rew, Dorking. On this occasion electric vehicles formed the subject of the display.

Members of the Electric Vehicle Association showed over thirty different kinds of delivery vehicles, universal trucks for the handling of goods and refuse collecting vans. In addition there was an indoor exhibition showing traction

A portion of the electric vehicle display at Dorking

batteries, controllers and chargers. As a further attraction visitors were invited to participate in the discussion on talks given each afternoon on "The Traction Battery" and "Battery Electric Vehicles."

The exhibition was officially opened by Sir John M. Kennedy, president of the Electric Vehicle Association, who was introduced by Mr. S. F. Osborne, commercial officer to the Surrey Sub-Area. A vote of thanks to Sir John was proposed by Mr. R. Birt, chairman of the E.V.A.

Those participating in the exhibition included: Austin Crompton Parkinson Electric Vehicles, Ltd.; B.M.A. & Electrical Equipment Co.; British Thomson-Houston Co., Ltd.; Chloride Batteries, Ltd.; Diamond Motors (Wolverhampton), Ltd.; D.P. Battery Co., Ltd.; Harborough Construction Co., Ltd.; Helecs Vehicles, Ltd.; Lancaster Electrical Co.; Lansing-Bagnall, Ltd.; T. H. Lewis, Ltd.; Midland Vehicles, Ltd.; Sidney Holes Electric Vehicles; Smith's Electric Vehicles, Ltd.; Trojan, Ltd.; Tudor Accumulator Co., Ltd.; Tomlinson (Electric Vehicles), Ltd.; Westinghouse Brake & Signal Co., Ltd.; and Young Accumulator Co., Ltd.

Anglo-Canadian Project

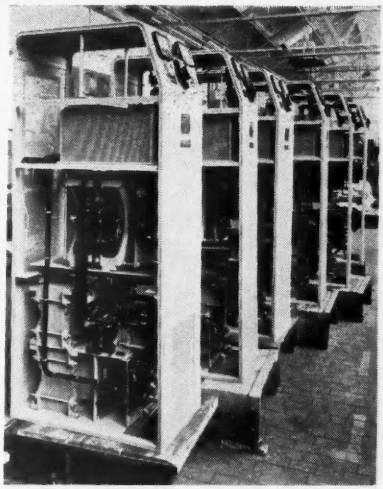
After returning from a tour of North America Mr. S. J. Harris, head of the Newage group of engineering companies, announced that an important outcome of his trip was that Canada is to make generating sets from components manufactured or designed entirely in Great Britain. The Canadian-made generating sets, which will go into production within the next three months, will incorporate the Stamford alternator, and will use Arthur Lyon switchgear, to be manufactured in Canada from British designs.

Joseph Lucas Conference

A conference was held on 14th April at the Grand Hotel, Eastbourne, by Joseph Lucas, Ltd., when 300 motor agents and traders were given an insight into recent developments in car lighting equipment by Dr. J. H. Nelson, chief lighting engineer of the company. The Mayor of Eastbourne, Alderman E. C. Martin, J.P., attended, and the guests were welcomed by the conference chairman, Mr. J. Masterton (sales director), supported by directors of Joseph Lucas (Sales & Service), Ltd., and Joseph Lucas (Batteries), Ltd. During the conference the guests were able to view various working exhibits.

Voltage Regulators for Amsterdam

The accompanying picture shows a line of automatic voltage regulators at the works of Foster Transformers, Ltd., Wimbledon, which form part of a large order recently despatched to Amsterdam for use in the research laboratories of the Royal Dutch Shell Organization. Each of these 15 kVA throughput, single-phase regulators makes use of the electromagnetic voltage sensitive automatic control unit.



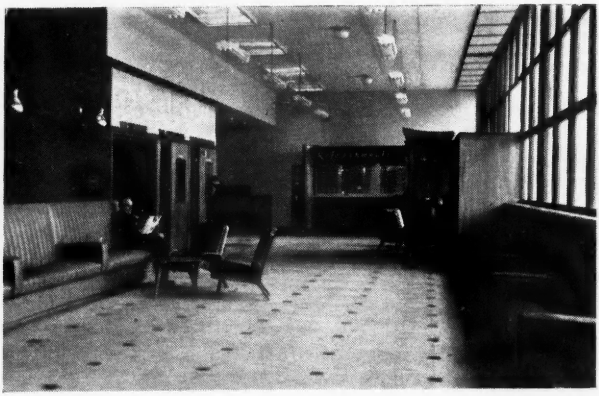
Voltage regulators at the works of Foster Transformers, Ltd., which form part of a large order for the Royal Dutch Shell Organization, Amsterdam

Safety Exhibition

A safety week and exhibition are being held by Kodak, Ltd., at Kodak Hall, Wealdstone, from 27th April to 1st May. The exhibition will cover safety in the factory and in the home and will illustrate correct and incorrect guarding of machines, defective tools that cause accidents, the use of colour in relation to safety in industrial establishments, and the correct use of lifts and hoists. On the domestic side, safety in the home will be demonstrated in a fully equipped bathroom and by other exhibits, including fire guards, and examples of bad electrical installations.

Hoover Window Display Contest

A Coronation year window display contest opened to all Hoover dealers on 30th March and will run until 9th May. Prizes totalling over £650 are offered for the best displays featuring a Hoover cleaner. There will be first, second and third prizes of 50 guineas, 25 guineas and 15 guineas in each of three categories, namely electricity showrooms, departmental stores and home furnishers, and electrical contractors and ironmongers. From these winners the national winner will be chosen for the National Challenge Cup; this cup winner will receive a special 100 guinea prize. In addition



Wall and ceiling panel heaters are used to heat these waiting rooms, refreshment bar, etc., at the Bergen Steamship Company's new terminal at North Shields *[South Shields Gazette photo*

thirty extra prizes of 10 guineas each will be awarded for the best displays in each of the above categories in each Hoover branch.

Canadian Cable Factory

The Pyrotenax Co., Ltd., which began business at Hebburn-on-Tyne in 1937, has built a factory of 55,000 sq ft at Trenton (Canada) at a cost of about £300,000. The factory will be officially opened on 4th May by an official of the Canadian Government, and Sir Brograve Beauchamp (chairman) and Mr. F. W. Tomlinson (managing director) of the company have left England to attend the opening ceremony. The Pyrotenax Co. has built the new Canadian factory to meet the growing demand for the company's mineral-insulated cables in Canada and the U.S.A. Most of the capital needed has been raised in this country with the approval of the Treasury. Four keyworkers are being sent from Hebburn to train personnel for the Canadian works. Mr. E. J. Davis, former London manager for Pyrotenax, has been appointed general manager and director of the Canadian works while Mr. T. Joicey, formerly of Whitley Bay (Northumberland) and now in Canada, has been appointed works manager.

Panel Heating at Shipping Terminal

A low temperature heating installation involving the use of electric panels in the walls and ceilings has been employed effectively at the new terminal of the Bergen Steamship Company at the Tyne Commission's Quay at North Shields. Occupying part of the transit shed the new buildings comprise customs offices, immigration and medical rooms, waiting rooms, refreshment bar, bookstall, inquiry office and a bureau for changing currency.

The building has a main installed heating capacity of 70 kW provided by about 150 "Medrae" panels. Most of these are 4ft by 2ft units with loadings averaging 600 W, installed in the walls and ceilings, but there are a number of smaller units measuring only 32in by 9in and with loadings of 150 W behind the seats.

The installation also includes about 25 kW of lighting, principally fluorescent, utilizing Philips "Instant Start" equipment. Other electrical apparatus provided comprises Philips public address equipment, a special Cona coffee making set, a Heatrae water boiler and a Sadia thermal storage water heater. The architects for the scheme were Messrs. Edwards and Manby and the electrical contractors Messrs. Hepplewhite and Manuel.

Japanese Television Contract

Pye, Ltd., announces that in competition with several other manufacturers, including a number of American concerns, it secured a substantial television contract for Radio Tokyo. During the summer three camera chains and the associated control equipment, all of which will operate on the American system, will be shipped to Japan.

North London Exhibition

Although still unrepaired bomb-damaged halls prevent the arrangement of such extensive displays as were customary up to 1939, the first post-war North London Exhibition at Alexandra Palace contains a remarkably comprehensive and varied collection of modern ideas on well over a hundred stands. Electricity plays a conspicuous part and the reduction in purchase tax has resulted in an intensified interest in the many labour-saving devices on view there.

On a large central stand the Eastern Electricity Board is giving demonstrations of cookers, washing machines and food mixers throughout the day and a model electric kitchen shows how attractive and easy to keep clean is the various apparatus installed. A specially attractive feature is the "Wall of Light" made from glass and illuminated in red, white and blue. For this scheme Thorn Electrical Industries, Ltd., who are responsible for lighting the stand, have employed eight "Atlas" lighting units controlled

from an automatic colour changing and mixing unit. The remainder of the stand is floodlighted by ten reflectors incorporating 5ft 80 W "double-life" white tubes, other types of fittings being installed in the demonstration kitchen.

An electric polisher being used for floor scrubbing is to be seen on the Hoover stand together with examples of vacuum cleaners and washing machines. The new "Regal" upright bag type machine is among the display of "Goblin" vacuum cleaners, washing machines, irons, "Teasmade" sets, etc., by the British Vacuum Cleaner & Engineering Co., Ltd. Wilkins & Mitchell, Ltd., make a special feature of the fact that their latest "Servis" washing machine heats the water. Hillman sewing machine motors are shown by Domestic Motors, Ltd., and the "Cats Eye" radium adaptor for locating light switches in the dark is demonstrated by Chapman-Parker (London), Ltd.

Packaging for U.S. Defence Orders

The Federation of British Industries has agreed to act as the British clearing house for inquiries concerning packaging materials for the United States defence orders being placed in Western European countries. Inquiries should be addressed to the Overseas Directorate of the F.B.I., 41, Buckingham Palace Road, London, S.W.1.

Kenwood Electrics Convention

Some 150 members of a limited dealership scheme operating throughout the East Midlands area attended a "forum" organized by Kenwood Electrics, Ltd., of Old Woking, Surrey, in conjunction with their area distributors, Furse Wholesale, Ltd., of Nottingham, at the Astoria Ballroom, Nottingham, on 15th April. In addition to technical and practical demonstrations of the Kenwood "Chef" food mixer, dealers were introduced to a new portable hand food mixer, the "Kenwood Minor." Two new attachments for the "Chef" were demonstrated, namely a tin opener and a juice separator. The first public showing in this country was given of a film entitled "The Art of Living," produced specially for Kenwood Electrics, showing the "Chef" in production and use. Addressing the assembly, Mr. K. Wood (managing director of Kenwood Electrics) said that a potential market existed in this country for food mixers. If dealers increased their volume of sales, price reductions could be made and passed on to the public. The visitors were welcomed by Mr. T. C. Bond, a director of Furse, who said they had arranged this meeting, the first of its kind, to try and help dealers, and also themselves, in discussion, to raise sales of the Kenwood products.

Fire at G.E.C. Leeds Branch

A fire broke out in the early hours of Friday last week at the Leeds branch of the General Electric Co., Ltd. The centre section of the building was destroyed but the two wings remained intact. We are assured that business is proceeding at the branch as usual and that there will be no delay in deliveries.

Revised Lamp Prices

A list of revised prices has been circulated to the trade by the Electric Lamp Manufacturers' Association to take account of the purchase tax reductions. In the groups covering general lighting service and fluorescent lamps the tax is reduced from 24⅛ to 18⅛ per cent. The tax on automobile and cycle dynamo lamps and radio panel lamps falls from 22 to 16¼ per cent and on Christmas tree and telephone lamps from 25 to 18½ per cent.

Brush Aboe Australian Company

A new overseas company has just been formed by the Brush Aboe group, with the title of Brush Electrical (Australia) Pty., Ltd., with head offices in Sydney, N.S.W. The chairman and managing director of the new company is Mr. V. J. Chalwin, who is already chairman and managing director of British Oil Engines (Australasia) Pty., Ltd. The two companies are entirely separate, but Mr. Chalwin will, by virtue of his new appointment, be able to co-ordinate the work of the engine and electrical divisions of the group in Australia. He is at present in this country to report on the progress of the group in Australia and the prospects for the new company. Barlow &

At the Kenwood Electrics, Ltd., and Furse Wholesale, Ltd., dealers' convention in Nottingham. Left to right: Mr. T. C. Bond (director, Furse), Mr. K. Wood (managing director, Kenwood) and Mr. S. J. Furse (managing director, Furse)

Retallack, Ltd., of Melbourne, the former agents of Brush Export, Ltd., for the whole of Australia, will retain the Brush agency for the State of Victoria. Two of their directors have joined the board of Brush Electrical (Australia).

Domestic Cooker Developments

The General Electric Co., Ltd., has reduced the prices of its range of domestic cookers and at the same time introduced certain changes in design. Two-tone ivory or cream and green finishes are supplied as standard without extra charge. Extra models have been added to the company's range of two-plate and three-plate "economy" cookers. The new models incorporate a drawer for storing pots, pans and other utensils, but are otherwise identical with the DC 453 and DC 753 models. The DC 114 three-plate cooker is now only available fitted with "Simmerswitch" control on the 8in plate and with a heated drawer. All the cookers mentioned are now supplied with fuses and thermostatically controlled ovens as standard equipment.

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	.. ..	ton £161 0s 0d
COPPER, H.C. Electro	.. ..	ton £280 0s 0d
Fire Refined 99·70 per cent	..	ton £272 0s 0d
Fire Refined 99·50 per cent	..	ton £269 0s 0d
COPPER Tubes	.. .. ..	lb 2s 7⅝d
Sheet	.. ..	ton £333 10s 0d
H.C. wire and strip	.. ..	ton £312 5s 0d
LEAD, English	.. .. ..	ton £78 10s 0d
Foreign	.. ..	ton £77 0s 0d
MERCURY	.. .. ..	flask £70 10s 0d
TIN	.. ..	ton £700 0s 0d
ZINC, G.O.B. Foreign	.. ..	ton £66 0s 0d
Electrolytic	.. .. ..	ton £67 10s 0d
BRASS Tubes	.. .. ..	lb 2s 1¼d
Sheet	.. ..	ton £260 5s 0d
Wire	.. ..	lb 2s 7⅛d
PHOSPHOR BRONZE		
Wire	.. ..	lb 3s 11¼d
RUBBER, No. 1 R.S.S. spot	..	lb 20⅛d–20i½

Board Acquires Glasgow Premises

The South West Scotland Electricity Board is to acquire four-storey premises in Sauchiehall Street, Glasgow, of the Engineering Centre, Ltd., when the owners leave in September. It is hoped to open the premises by the end of the year.

Portable Electric Tool Demonstration

Organized by F. Westerman (Wholesale), Ltd., a joint demonstration of Wolf and Black & Decker tools took place in Dudley, Worcestershire, on 9th April. At the invitation of Timmins & Foulkes, Ltd., the local authorized tool dealers, the demonstration was attended by representatives of local authorities, works managers, and building trade supervisors.

Aircraft Starting Units

A statement published in the technical press recently claimed that a prototype ground starting unit which had been developed was believed to be the largest in the world. In view of this Auto Diesels, Ltd., state that for some time past they have had both in production and airfield operation Crompton Parkinson—Auto Diesels ground power units for starting and servicing the largest and fastest aircraft in the world. The most recently constructed unit consists of a diesel engine driving two generators giving outputs of 450 A continuously at 112 V, and 750 A continuously at 28 V. In addition the unit will supply peak starting currents of 1,000 A at 112 V and 2,000 A at 28 V. Simultaneous outputs for 28 V servicing and 112 V starting are permissible up to 112 kW.

Trade Announcements

The **Brush Electrical Engineering Co., Ltd.,** Loughborough, is opening a new branch office on 27th April, to serve the West of England, at 14-16, Baldwin Street, Bristol. 1 (telephone : Bristol 27000). From that date, the existing temporary office in Bath will be closed. The manager of the Bristol area is Mr. J. H. Beaumont Robins, B.Sc., A.M.I.E.E., A.M.I.Mech.E.

The **Willesden Transformer Co., Ltd.,** has moved to 2a, Frithville Road, Shepherds Bush, London, W.12 (telephone : Shepherds Bush 5819).

E. K. Cole, Ltd., have appointed Mr. W. N. Preston as a car radio sales representative. Mr. Preston will operate in the northern territory.

Dimplex, Ltd., states that its sales manager, Mr. L. W. Knight, has moved from Southampton to London. His address is now 9, Stane Way, Ewell, Surrey (telephone, Ewell 8297). The area covered by the company's northern representative, Mr. T. E. Green, has been extended to include Northumberland, Durham, Cumberland and Westmorland. Mr. Green's address is 40, Longley Lane, Northenden, Manchester (telephone : Wythenshawe 2679).

Catalogues and Lists

W. G. Pye & Co., Ltd., Granta Works, Cambridge.—Illustrated catalogue of a wide range of "Pye" scientific instruments and accessories (H).

New Day Electrical Accessories, Ltd., 136-8, Mary Street, Balsall Heath, Birmingham, 12.—Illustrated and priced catalogue of switches, socket outlets, plugs, conduit boxes, etc. (AC/53).

Muirhead & Co., Ltd., Beckenham, Kent. —24-page technical brochure on vibration measurement and waveform analysis.

E.A.W. Conference

A More Promising Outlook for Electrical Development

Lady Swaythling speaking at the E.A.W. Conference lunch. Col. B. H. Leeson is on the right

PROSPECTS of more positive action in women's sphere of electrical development were made apparent at the twenty-eighth annual conference of the Electrical Association for Women held on Wednesday last week at the Connaught Rooms, London, under the presidency of the Dowager Lady Swaythling. About 500 members and their friends were present from most of the 125 branches of the Association, and the guests included Members of Parliament and representatives of all sections of the electrical industry, and the Ministries of Fuel and Power, Health, and Food.

Presenting the annual report, Dame Caroline Haslett, director of the E.A.W., said that in the past year encouragement was given to all those who sincerely believed that electricity had unlimited potentialities in every department of modern life, not only in the prescribed channels to which the envious or unprogressive would confine it.

The Association had proclaimed once again its own faith in electricity, and was pleased to have a voice in the increasing volume of opinion which was now becoming articulate throughout the electrical industry. The E.A.W. was indeed a growing organization, not only in the total number of branches, to which twelve were added last year, but in the depth of its experience and in the range of its activities and extent of its influence.

The publication in the autumn of "Towards Perfection," a report expressing

Lord Citrine, Miss Pat Hornsby-Smith, Mr. H. J. Randall, Lady Maxwell Fyfe and Sir Henry Self

the views of 1,280 users on their practical experience of over 10,000 appliances, had created a great deal of interest and manufacturers had welcomed the opinions both as a confirmation of the efficiency of their products and as guidance for features to be incorporated in future designs.

The E.A.W. had welcomed the change of attitude in the electrical industry regarding the fuel situation. The general improvement in power station capacity had allowed the emphasis to be shifted from the defensive position illustrated by the intensive economy campaigns of former years to the development in electricity usage outlined at the British Electrical Power Convention last June.

Regarding the reduction in purchase tax announced the previous day, Dame Caroline suggested, and it was unanimously approved, that a telegram should be sent to the Chancellor of the Exchequer expressing their appreciation and their hope of the early abolition of purchase tax on all the " housewife's tools of trade."

As evidence of the increased educational activities of the Association Dame Caroline mentioned a 50 per cent increase in the number of home workers' certificates awarded. It was hoped that ways would be found to increase the rate of affiliation of schools.

In conclusion the report stated that the National Executive Committee was happy to present a report which bore all the signs of a more progressive policy in domestic electrification, and it was pleased that the Association had been able to give tangible evidence of its readiness to take part in this development.

N.E.C. Elections

The six vacant places on the National Executive Committee were filled, after a ballot, by the Dowager Lady Swaythling, Miss N. Balls (Newcastle-upon-Tyne), Mrs. S. R. Bird (Isle of Wight), Mrs. E. Boot, J.P. (Sheffield), Mrs. A. T. Dover (London), and Mrs. Trevor Rees (Swansea).

At the close of the meeting the winner of the E.A.W. Golf Competition, Mrs. B. Leeson, was presented with the Lady Hughman Challenge Bowl. The runner-up was Mrs. H. F. Carpenter. Mrs. M. Clarkson was the winner of a prize for the best scratch score, Dame Caroline Haslett winning a prize for the least putts.

Proposing the toast of " Coronation Year " at the annual luncheon which followed, Mr. H. J. Randall, chairman of the London Electricity Board, welcomed Miss Pat Hornsby-Smith, M.P., Parliamentary Secretary to the Ministry of Health, and said it was an additional pleasure to do so because before the war she had been on the staff of one of the London electricity supply undertakings and had in fact won the E.D.A. public speaking contest in 1938.

Visitors to London would, he said, notice the important part that electricity was playing in the Coronation celebrations which could be contrasted with the illuminations of the Coronation of King Edward VII just over fifty years ago when some of the principal buildings were festooned with thousands of 8 candle-power carbon lamps in small coloured glass fittings. Nowadays the small carbon lamp was virtually unknown, and the skilful use of electric floodlighting displayed the beauty of London's architectural treasures. Throughout Britain there were buildings of great dignity and historic interest, and it was to be hoped that the floodlighting of those buildings would not be limited to special occasions but would be regularly undertaken each year.

Electricity in the Home

The external illumination of buildings was but one detail in the wonderful advance of electricity since 1902; the domestic use of electricity had been extended and revolutionized, and while men had taken a greater interest in domestic affairs, the driving force had come from women who, with widening cultural horizons before them, had perceived that electricity could remove much of the drudgery from domestic work. He thought that each Electricity Board in this country should have at least one woman member, and he paid a tribute to the contribution which Dame Caroline Haslett had made towards the development of electricity supply.

A hundred years hence our great-grandchildren in their atomic age would smile at some of the antiquated forms of heating and cooking which we still used, and would be amazed, perhaps, that at a time of economic difficulty we did not make even more strenuous efforts to extend the use of electricity in our factories, farms and homes.

In reply Miss Hornsby-Smith referred to the great developments in the world of

health, nursing and medicine, and spoke of electricity's great contribution in health and healing. She paid a special tribute to the very generous interest shown by the E.A.W. branches in presenting electrical remedial equipment to hospitals, old people's homes and special rehabilitation centres for the disabled. She congratulated the Association on its educational work, particularly with regard to safety in the home.

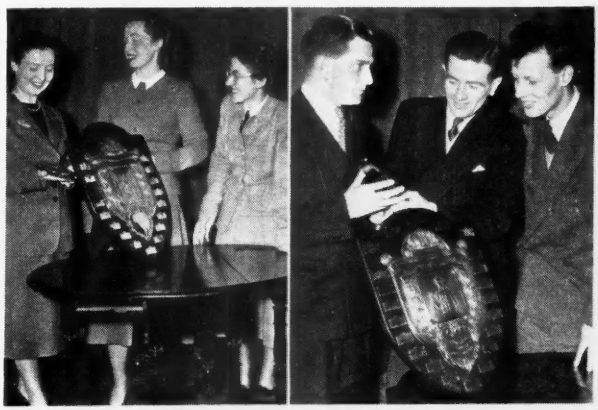
In responding to the toast of "The Merchant Adventurers of the New Elizabethan Age," proposed by Lady Maxwell Fyfe, president of the E.A.W. Liverpool Branch, Colonel B. H. Leeson, President of the Institution of Electrical Engineers and director of the British Electrical and Allied Manufacturers' Association, paid tribute to the E.A.W. and said that the electrical industry was the second largest exporting industry in the country. In the coming era the industry would be the spearhead of Britain's economic recovery and prosperity. In his drive for more overseas currency to pay for our food and raw materials, the fundamental need of the electrical merchant adventurer was a sound and expanding home demand. Paradoxically, the housewife's demands for domestic electrical appliances had been drastically restricted by legislation and other means.

In the face of growing competition the world over it was now imperative to restore freedom to the electrical merchant adventurer to allow him to develop his home market and so build up the resources and strength necessary to intensify his export efforts and ventures into new markets. Every housewife, therefore, who installed an electrical appliance, for example, a new cooker, was not only doing a wise and prudent thing, but was, moreover, contributing to the national effort by strengthening an industry which was taking the greatest share in paying for our food imports.

E.D.A. PUBLIC SPEAKING COMPETITION

THE finals of the E.D.A. Public Speaking Competition were held on 17th April at the Lighting Service Bureau, London. In the men's section there were nine candidates, the winner being Mr. S. G. Martyn (sales representative, South Cornwall (St. Austell) District, South Western Electricity Board). The second place was won by Mr. J. E. Evans (general assistant mains engineer, Gloucester District, Midlands Electricity Board), and the third by Mr. P. Tatchell (first assistant chemist, Little Barford power station, Eastern Division, B.E.A.). The adjudicators were Miss Vera Norvick (assistant secretary, E.A.W.), Mr. F. Phillips (B.B.C.), and Mr. B. J. Ross, M.A. (history master, City of London School).

In the women's section there were ten candidates and the winners were: First, Miss Elizabeth A. Roberts (demonstrator, Rhuddlan District, Merseyside and North Wales Electricity Board); second, Miss Joan M. Stables (service centre assistant, Kendal, North Western E.B.); third, Miss Kathleen M. D. Barker (assistant information officer, South Western E.B. headquarters). The adjudicators were Mrs. Frank Forrest, Mr. F. Phillips and Mr. B. J. Ross. Dame Caroline Haslett made the presentations.



Winners of the E.D.A. Public Speaking Competition. Left to right: Miss Elizabeth A. Roberts, Miss Joan M. Stables, and Miss K. M. D. Barker, Mr. S. G. Martyn, Mr. J. E. Evans and Mr. P. Tatchell

ELECTRICITY SUPPLY

Development in the North-East

Higher Output in March

DETAILS have been announced of stage four of the North Eastern Electricity Board's rural electrification plan. The first stage (costing £138,915) was approved in July, 1949; the second stage (£240,000) in March, 1950; and the third (£389,000) in January, 1951. The fourth stage is to cost £524,536 and provides for electricity supplies to 107 villages comprising 1,726 consumers, including 217 farms, and 150 isolated houses and farms on the route of the proposed high-voltage lines. If capital is available it is hoped to complete these supplies within two or three years.

Dealing with electrical developments in urban areas, the Board states that a survey has shown that there are 118,000 houses in the Board's area without electricity. This figure does not include condemned houses and property to be demolished or other premises in such a bad state of repair that the owners were not likely to bear the cost of installing electricity. To supply these 118,000 houses would cost £6,400,000 and a seven-stage development plan had been prepared. There are about 17,000 premises in each stage and capital expenditure ranges from £700,000 in the first stage to £1,174,880 in the last stage. The first stage is to be carried out from April 1st this year to March 31st next year and will include supplying 15,293 consumers in the Tyne area, 1,912 in the Wear area and 750 in the Tees area.

The North Eastern Electricity Board has completed arrangements for taking over the low voltage network in the Stanley (Co. Durham) area hitherto controlled by the National Coal Board. The Electricity Board is carrying out a survey in connection with improvements to the system. The work will take about five years. Having been told that it will be three years before electricity is supplied to Craghead, the U.D.C. is asking the Board whether council houses in the Craghead and Bloemfontein areas can be supplied immediately through the existing substations and transformer equipment.

Generation in March

A rise of 8·8 per cent—the highest since November—is recorded in the Ministry of Fuel & Power's statement of electricity generated last month by the British Electricity Authority and the North of Scotland Hydro-Electric Board. Of the total (5,992 million kWh compared with 5,509 million in March, 1952) only 86 million kWh was generated by water power against 134 million in the corresponding month of last year (see Table 1).

Plant capacity at the end of March aggregated 17,788 MW, of which 17,229 MW was in B.E.A. stations. No new sets were commissioned during the month but additional boilers were brought into operation at twelve stations. They comprised Babcock & Wilcox units at

TABLE 1.—ELECTRICITY GENERATED AND PLANT INSTALLED

	Fuel consumed Thousand tons			kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.r.) MW
	Coal	Coke and Breeze	Oil	Steam	Water power	Total*		
British Electricity Authority ..	3,236	87	4·9	5,854	19	5,883	5,535	17,2[illegible]
North of Scotland Board ..	26	1	1·3	37	67	109	107	[illegible]
Total for March, 1953	3,262	88	6·2	5,891	86	5,992	5,642	17,7[illegible]
Corresponding total for March, 1952	3,023	74	6·1	5,361	134	5,509	5,196	16,4[illegible]
Increase or decrease, per cent ..	+7·9	+18·9	+1·6	+9·9	−35·8	+8·8	+8·6	+8·[illegible]
Total to date (3 months) ..	10,127	271	25·6	18,049	307	18,403	17,346	
Total for corresponding months of 1952	9,806	222	21·9	17,091	442	17,580	16,600	
Increase or decrease, per cent ..	+3·3	+22·1	+16·9	+5·6	−30·5	+4·7	+4·5	

* The total includes 9·6 million kWh generated by oil engines and 5 million kWh by waste heat plants in March, 195[illegible].

TABLE 2.—ELECTRICITY SENT OUT BY AREA BOARDS FOR THEIR CONSUMERS

Area Board	Totals for March			Twelve Months Totals Ended 31st March		
	1952 Mill. kWh	1953 Mill. kWh	Increase or Decrease %	1952 Mill. kWh	1953 Mill. kWh	Increase or Decrease %
London	499·1	555·1	+11·2	5,298·6	5,545·7	+ 4·7
South Eastern	285·9	313·2	+ 9·5	3,014·9	3,201·9	+ 6·2
Southern	332·1	366·3	+10·3	3,450·3	3,742·6	+ 8·5
South Western	156·4	175·3	+12·1	1,688·1	1,799·3	+ 6·6
Eastern	459·2	504·8	+ 9·9	4,901·0	5,206·3	+ 6·2
East Midlands*	378·9	428·1	+13·0	4,239·4	4,448·5	+ 4·9
Midlands*	530·4	566·8	+ 6·9	5,776·5	6,000·6	+ 3·9
South Wales*	275·7	300·0	+ 8·8	3,139·0	3·308·0	+ 5·4
Merseyside and North Wales*	306·8	307·6	+ 0·3	3,468·3	3,348·7	− 3·4
Yorkshire*	503·4	544·1	+ 8·1	5,546·6	5,827·1	+ 5·1
North Eastern*	311·6	318·6	+ 2·2	3,542·4	3,496·2	− 1·3
North Western*	566·5	603·1	+ 6·5	6,479·3	6,368·8	− 1·7
South-East Scotland	108·6	115·4	+ 6·2	1,189·1	1,236·0	+ 3·9
South-West Scotland*	264·2	284·1	+ 7·5	2,897·6	2,990·7	+ 3·2
Total all Area Boards	4,978·8	5,382·5	+ 8·1	54,631·1	56,520·4	+ 3·5
Direct Supplies by Central Authority	62·4	77·6	+24·4	709·2	766·0	+ 8·0
Grand Total	5,041·2	5,460·1	+ 8·3	55,340·3	57,286·4	+ 3·5
Mainly Industrial Areas marked*	3,137·5	3,352·4	+ 6·8	35,089·1	35,788·6	+ 2·0
Mainly Non-Industrial Areas	1,841·3	2,030·1	+10·3	19,542·0	20,731·8	+ 6·1
Total Number of Working Days	28·32	28·53				

* Those in which industrial consumers took over 50% of the total sales in the preceding financial year.

Uskmouth (360,000 lb/hr), Braehead (300,000 lb/hr), Brighton "B" (320,000 lb/hr), Carmarthen Bay (240,000 lb/hr), Rye House (350,000 lb/hr), Walsall (180,000 lb/hr) and North Tees "C" (360,000 lb/hr), a Clarke Chapman 300,000 lb/hr boiler at Braehead, an International Combustion 200,000 lb/hr unit at Rotherham, a Mitchell 200,000 lb/hr unit at Thornhill, a Simon-Carves 305,000 lb/hr boiler at Huncoat and a John Thompson 180,000 lb/hr unit at West Ham.

Table 2 analyses kWh sold by the Authority and taken by Area Boards for their consumers. The national figures show an increase over March, 1952, of 8·3 per cent, but, when corrected for weather and the number of effective working days, the increase is 7·3 per cent. The weather conditions were slightly colder and there were more effective working days.

Australian Plant Schemes

New South Wales has projects under construction or planned which will increase its total capacity to 2,181,000 kW by 1958 (more than the total power available from all Australian generating stations in 1951). Additions in Victoria will bring the generating capacity to 998,000 kW by 1956. South Australia will have 135,000 kW by 1956; Western Australia is increasing its capacity to 90,000 kW; and Tasmania, by 1958, will have a total installed capacity of 556,000 kW. In addition, there is the Commonwealth Snowy River scheme which will have an eventual generating capacity of 3 million kW, although this may not be achieved for more than twenty-five years.

The State Electricity Commission of Victoria will need new capital funds amounting to at least £30 million a year for some time to come if it is to meet its commitments and maintain even a moderate rate of new construction work. Electricity produced last year totalled 2,598 million kWh (a new record) and sales to consumers increased by 2 per cent.

Methane Gas Turbines

Recent gas turbine developments have been noted by York Highways Committee, which considers that this type of plant would probably be the most economic for the generation of electricity when the scheme for the use of methane gas at the sewage works is undertaken. It has asked its city engineer to report further on the matter.

Floodlighting at Woolwich

Woolwich Corporation is recommended to approve a scheme, estimated to cost £1,700, for the provision of permanent floodlighting installations at Bostall Gardens, Sideup Road roundabout, Well Hall Road roundabout, and Well Hall Pleasaunce, and for a temporary installation at Prince Imperial Monument.

South Shields Transport Finances

During the year ended 31st March last, South Shields Corporation transport undertaking, which includes trolley-buses and motor-buses, made a profit of £177 compared with a loss of £14,634 in the previous year.

Financial Section

STOCKS and SHARES

THE Budget has been warmly approved in the City, but, with other matters also demanding attention, Stock Exchange markets have been showing notable restraint in their reception of it. An initial burst of enthusiasm was quickly replaced by something more like sober satisfaction. Gilt-edged stocks showed pronounced strength but prices gave way from the recent best upon the announcement of an issue of £125 million British Electricity 4½ per cent stock at 100 dated 1974–79. In the industrial markets, the tone is better but the larger price improvements shown in our price lists are connected mainly with situations appearing to be specially favoured by changes in purchase tax and the excess profits levy. Coming abolition of the latter would, for instance, account largely for the good rises in A.E.I. and English Electric shares. Purchase-tax considerations have a good deal to do with the improvements in Decca, E.M.I., Cossor, Hoover, British Vacuum Cleaner and others.

C.A. Parsons Results

Expectations regarding C. A. Parsons & Co.'s dividend had been modified a week before the announcement as a result of the associated Reyrolle company's conservative decision. Having receded previously to a point about 10s below the recent highest of 75s, the price of C. A. Parsons shares was marked down to 62s 6d following the news, but they were changing hands at around 65s soon afterwards. From the first figures, it appears that trading profits for 1952 were maintained at about the previous level, so that an addition of £180,000 to tax charges left the net surplus about that much lower at £815,000. Ordinary dividends for the year total 12½ per cent, or 2½ per cent more than before on the basis of the present capital. Nine-tenths of the year's surplus earnings apparently go back into the business. A yield of barely 4 per cent on the shares recognizes the fact that the dividend is among the most conservative in the industrial list.

B.I.C.C. Dividend

British Insulated Callender's Cables £1 shares responded, with a rise of 1s 3d to 37s, to the company's decision to add another 1 per cent to the ordinary distribution, and to the excellent figures in the preliminary profits statement for 1952. The extra payment is made in raising the cash bonus to 2½ per cent, and gives a total of 10 per cent for the year. This applies to ordinary capital increased since last time by the issue of more than 3 million new shares, and involves the distribution of an additional £236,000 at £673,000. Net group profits attributable to the parent company came out £373,000 higher, at a little over £3 million, so that less than a quarter of the surplus is being paid out in dividends. Trading profits, before much heavier tax charges, were up by nearly £1½ million. The yield of 5·4 per cent on the shares is appropriate to their high investment ranking.

Enfield Cables

An emphatic recovery in the Enfield Cables group's earnings during 1952, reported last week, came well up to previous anticipation, and left the quotation for the 5s shares 1s up at 22s. Before allowing for taxation, the profit of £405,000 compares with the surplus of £72,000 recorded as a result of the setback of the previous year, and tops the balance of £381,000 for 1950. Earnings on the latest scale would have provided comfortably for the maintenance of the 7½ per cent rate of dividend paid since the war, but the necessity for conserving resources has caused the board to recommend a reduction to 5 per cent.

More Dividend News

There was little change in the price of Chloride Electrical Storage £1 shares after the company's decision to increase the annual distribution by adding a 5 per cent bonus to the 15 per cent dividend. The effect of this was offset to some extent by the contraction reported in the profits statement, although the net surplus still covers very comfortably the greater distribution. Allen West's dividend of 15 per cent for the year is at the same rate as before, but with larger capital ranking this time it costs £20,000 more. Profits are up by about £130,000, or over 40 per cent, and the resultant additions to general reserve bring that account nearly level with the £1,170,000 issued capital. The 5s shares rose to 12s 3d on the news. Veritys dividend is advanced from 7½ per cent to 10 per cent; the price is unchanged at 5s.

End of E.P.L.

Plenty of material is available, from the annual results already published this year, for the present popular market exercise of comparing, in the case of individual firms, the liabilities under E.P.L. alone, with the net amounts distributed in ordinary dividends. The calculation gives a rough guide to the relative significance of the former's removal. The A.E.I.

accounts were striking in that respect, the E.P.L. charge of over a million being by itself larger than the net distribution to ordinary shareholders. Similarly, English Electric charged £505,000 to E.P.L., and paid £418,000 to ordinary shareholders. In the case of International Combustion the respective figures were £190,000 for E.P.L. (nine months only) against £147,000 in dividend; for Westinghouse Brake £97,000 (also for nine months) against £88,000; and for Reyrolle £391,000 against £134,000. Mather & Platt's E.P.L. charge of £140,000, for instance, was not far short of the £161,000 paid to ordinary stockholders.

Company	Dividend Previous	Dividend Last	Middle Price 20th April 1953	Week's Rise or Fall	Est. Yield p.c.
Gilt-edged and Overseas Stocks			£ s d		
Brit. Elec. 1968/73	3	3	87½	+1	3 8 7
Brit. Elec. 1974/77	3	3	86½	+1½	3 9 4
Brit. Elec. 1976/79	3½	3½	92	+1	3 16 1
Brit. Elec. 1974/79	4¼	4¼	101	+1	4 4 2
Calcutta Elec. ..	6†	6†	20 6	—	5 17 0†
East African Power	7	7	23/-	—	6 1 8
Nigerian Elec. ..	10	10	22 6	—	8 18 0
Palestine Elec. "A"	5†	Nil	13 6	—	—
Perak Hydro-Elec.	Nil	Nil	15/-	—	Nil
Equipment and Manufacturing					
AberdareCables(5/-)	20	25	16/-	—	7 16 4
Aerialite (1/-) ..	83½	88½	9 6	—	9 6 0
Allen, W. H. ..	15	15	46 3	—	—
Aron Elec. Ord. ..	15	15	38 9	—	7 14 10
Assoc. Elec. Ord. ..	20	20	80/-	+½	5 0 0
Automatic Tel. & El.	15	15	64/-	+1/-	4 13 9
Babcock & Wilcox	18	18	72 6	+9d	4 19 3
Baldwin, H. J. (2/-)	25	20	4/-	—	10 0 0
Bakelite (10/-) ..	—	12½	17 6	—	7 2 10
British Aluminium	12	12	40/-	−6d	6 0 0
B.I. Callender's ..	9	10	37/-	+⅛	5 8 0
British Thermostat (5/-)	30	30	33 9	−9d	4 9 0
British Vac. Cleaner (5/-)	25	25	14/-	+6d	8 18 6
Brook Motors (10/-)	20	20	35/-	—	5 14 3
Brush Ord. (5/-) ..	10	4	4 3	—	—
A. F. Bulgin (1/-) ..	30	30	3/-	—	10 0 0
Burco (5/-) ..	38¾	35	18 9	—	9 6 8
Chloride El. Storage	15	20	72/-	—	5 11 0
Cole, E. K. (5/-) ..	25	25*	17 6	+6d	—
Cossor, A. C. (5/-) ..	Nil	10	10 6	+6d	4 15 3
Crabtree (10/-) ..	17½	17½	31 3	—	5 12 0
Crompton Parkinson Ord. (5/-) ..	11¼	11¼	9/9	+3d	5 15 5
De La Rue (5/-) ..	50	35*	8 6	+3d	—
Decca (5/-) ..	112½	150	27/6	+2/-	5 9 0*
Dewhurst (2/-) ..	22½	19*	5/3	—	7 4 9
Dictograph Tel. (2/-)	20	20	6 6	+6d	6 3 0
E.M.I. (10/-) ..	12	12	14/6	+1/-	8 5 6
Electrical Components (5/-) ..	20	20	10/-	—	10 0 0
Elec. Construction	15	15	55/-	—	5 9 0
Enfield Cable Ord.	7½	5	22/-	+1/-	4 11 0
English Electric ..	15	15	59/-	+2/-	5 1 8
Ericsson Tel. (5/-)	22†	22*†	39 6	—	2 15 9†
Ever Ready (5/-) ..	35	35	28 6	−1/-	6 3 0
Falk Stadelmann ..	15	15	42/9	—	7 0 3
G.E.C. Ord. ..	22½	22½	42 6	—	5 6 0*
General Cables (5/-)	30	30	16 3	—	9 4 6
Greenwood & Batley	15	15	40/-	—	7 10 0
Hackbridge Cable (5/-)	20	20	12/-	—	8 6 8
Hackbridge Hewittic (5/-)	18	20	16 3	—	6 3 0
Hall Tel. Acc. (10/-)	10	10	12 6	—	8 0 0
Henley (2/-) ..	12½	12½	1/-	—	6 5 0
Henleys (10/-) ..	20	20	18 6	+6d	5 8 1*
Hivac (5/-) ..	15	20*	12 6	—	8 0 0
Hoover (5/-) ..	25	25	23/-	+⅛	5 8 0

Company	Dividend Previous	Dividend Last	Middle Price 20th April 1953	Week's Rise or Fall	Est. Yield p.c.
Equipment and Manufacturing (continued)			£ s d		
Intl. Combustion (5/-)	25	15*	14/-	+6d	5 7 2
Johnson & Phillips	15	15	58/3	—	5 3 0
Lancashire Dynamo	22½	12½*	46/3	—	5 8 0
Laurence, Scott (5/-)	12½	15	14/3	—	5 5 3
London Elec. Wire	12½	12½	58/3	+9d	4 5 9
J. Lucas	7½	9⅛	41/3	+⅛	4 9 0
Marryat & S. (2/-)	22½	22½	5/9	—	7 16 6
Mather & Platt ..	12½	15	49/-	+1/-	6 2 6
Metal Industries ..	10	15	46/-	+6d	—
Mid. Elec. Mfg. ..	15	15	60/9	—	4 18 9
Murex	12½	15	58/-	+6d	5 3 5
Newman Ind. (2/-)	10	10	2/4½	—	8 8 5
Oldham & Son (1/-)	30	35	2 6	—	—
Parnall (Yate) (5/-)	6	6	3 7½	+7½d	8 5 6
Parsons, C. A. ..	10*	12½	62 6	−2 6	4 0 0
Plessey (5/-) ..	22½	25	24 6	−1/-	5 2 0
Pye Deferred (5/-)	18	18	19 6	+⅛	4 12 4
Revo (10/-) ..	27½	27½	46/-	—	5 19 7
Reyrolle	10	12½	57 6	+2/6	4 7 0
Scot. Cable (4/-) ..	30	32	13/-	+3d	—
Siemens Ord. ..	10	10	36/-	—	5 11 0
Southern Areas ..	Nil	5	12/9	—	7 16 10
Strand Elec. (5/-) ..	17½	17½	10 6	—	8 6 8
Sturtevant (5/-) ..	16½†	17¼*†	25/-	—	—
Switchgear&Cowans (5/-)	22½	22½	16 3	—	6 18 6
Taylor T. (5/-) ..	20	25	20/-	—	6 5 0
T.C.C. (10/-) ..	20	20*	41/3	+2 6	—
T.C. & M.	10	8½*	28/-	—	6 1 6
Telephone Mfg. (5/-)	10	10	9/-	+3d	5 11 0
Thorn. Elec. (5/-) ..	10	12½	10/-	—	6 5 0
Tube Investments	25	15*	60/-	—	5 0 0
Vactric (5/-) ..	Nil	Nil	5/-	—	Nil
Veritys (5/-) ..	7½	10	5/-	—	10 0 0
Walsall Conduits (4/-)	70	70	46 6	—	—
Ward & Goldstone (5/-)	45	45*	34/3	—	—
Watford (2/-) ..	25	25	7/-	—	7 2 10
Westinghouse Brake	14	15	53 9	—	5 11 6
West, Allen (5/-) ..	15	15	12/3	+3d	6 2 6
Trusts, Transport and Communications					
Anglo-Am. Tel.: A Ord.	—	6	89½	—	6 14 0
Ord.	—	3¾	54½	—	6 17 6
Anglo-Portuguese	8	8	23/3	—	6 17 9
Brit. Elec. Traction: Def. Ord. ..	22½	25	505	+10	4 19 0
Cable & Wireless: Ord.	8	8	133	—	6 0 4
4% Loan ..	4	4	95	—	4 4 3
Calcutta Trams ..	6†	6†	22 9	—	5 5 6†
Cape Elec. Trams ..	5	5½	11 6	—	9 11 4
Marconi Marine ..	10	10	30/6	+6d	6 11 2
Oriental Tel. Ord.	16	16	69 6	+5 6	—
Telephone Props. ..	8	8	95/-	−10/-	—
Tele. Rentals (5/-)	10	10	10/3	+9d	4 17 6

* After capital bonus. † Dividends are paid free of Income Tax.

REPORTS and DIVIDENDS

The British Vacuum Cleaner & Engineering Co., Ltd., held its annual meeting on 15th April, Mr. J. J. Hambidge (chairman) presiding. In the course of his speech the chairman said that during the past year they had experienced contraction of their main business, the manufacture and supply of domestic electrical appliances. The disinflationary policy of the Government resulted in such restriction of consumer credit that the delayed effect of double purchase tax (66⅔ per cent) suddenly made itself sharply felt, and, in common with other manufacturers in the industry, they suffered a heavy setback in home sales. This situation was accompanied by a major collapse of their best export markets, particularly Australia. The volume of overseas trade sharply diminished in all markets, except Canada, where relaxation of consumer credit restrictions enabled them once again to go forward.

Substantially increased activity during the year took place in the industrial section, assisting to some extent in cushioning the impact of the recession in the domestic section. The order book in the industrial section continued to expand and they had been responsible for carrying out an increased volume of important contracts. The directors had had under consideration the need for further working capital. As a result of negotiations they had disposed of the freehold interest of their works at Leatherhead for a sum equivalent to more than three times the book value, while retaining to the company occupation under a favourable long-term lease with the option rights for re-acquisition at a later date if so desired. The result of this transaction was to liquefy their finances by a sum of £300,000, and after providing for costs and tax balancing charge there was a substantial capital profit.

Enfield Cables, Ltd., reports a group profit of £404,858, before taxation, for 1952, as compared with £71,752 for the previous year and £380,284 for 1950. Taxation provision requires £242,937, leaving a net profit of £161,921 (against £2,216 for 1951 and £169,748 for 1950), to which is added £52,576, profit on sale of investment. It is proposed to pay a final dividend of 7.2d per £1 unit, on the £1.4 million ordinary capital, making 5 per cent for the year. This compares with an interim dividend in the previous year of 3⅜ per cent on £1 million capital, and a final distribution of 3⅜ per cent on the present capital. The directors state that although profits would justify the maintenance of the same dividend as in previous years, it is essential to conserve resources. Moreover, the position of the Brynmawr Rubber subsidiary continues to cause anxiety, although there are now signs of some improvement. The group profit is after absorbing the losses on Brynmawr Rubber and its subsidiaries which amount to £209,335, plus £88,516 for exceptional non-recurring items. It is proposed to place £150,000 to reserve for contingencies, being £50,000 out of the profit on sale of investments and £100,000 to replace the transfer from reserve in 1951.

The Chloride Electrical Storage Co., Ltd., reports a surplus for 1952 of £653,656 (£1,175,662 in 1951). The surplus is struck after deduction of United Kingdom taxation of £1,130,255 and other taxation of £130,456, and to it is added profits relating to prior years £280,760, realized capital profit £13,563, and a balance brought forward of £790,795. After deducting a transfer to specific reserve of £230,673 and profits retained by subsidiaries, £386,458, there is a balance available of £1,121,643 (£870,004). New treatment of depreciation has affected transfers to specific reserves and the 1951 surplus has been adjusted by a charge of £210,610. It is proposed to pay, in addition to the dividend of 5 per cent paid last October on the "A" and "B" ordinary stock, a further dividend of 10 per cent and a bonus of 5 per cent, making 20 per cent for the year (against 15 per cent).

British Insulated Callender's Cables, Ltd., reports a group trading profit for 1952 of £9,423,182, as compared with £7,966,464 for the preceding year, to which is added other income making £9,592,095. From this are deducted £906,996 for depreciation, £84,663 interest, £266,855 for provisions and £4,869,146 for taxation, leaving a net profit of £3,464,435 (against £3,054,868), of which £3,069,756 is attributable to the holding company. Capital reserves receive £18,632, and revenue reserves £1,834,692. It is proposed to pay a final dividend of 5½ per cent and a cash bonus of 2½ per cent, making 10 per cent for the year on ordinary capital of £12,350,000 as increased by the £3,109,614 issued during the year. This compares with a distribution of 9 per cent for 1951 on ordinary capital of £9,240,386. The balance carried forward is £483,769 (against £257,349 brought in).

T. Clarke & Co., Ltd., report a consolidated net profit for 1952 of £10,391, as compared with £22,591 for 1951. The final dividend is 9 per cent, making 18 per cent for the year (same), but the interim dividend of 9 per cent was paid on smaller capital.

Allen West & Co., Ltd., report a group profit, after all charges, including £466,855 for taxation, of £429,475 for the year ended 31st January last, as compared with £297,609 for the preceding year. The profit attributable to the holding company is £428,818. General

reserve receives £370,000. The dividend for the year is unchanged at 15 per cent, but is payable on increased capital.

B.E.A. Issue.—The list opened and closed yesterday (Thursday) for an issue of £125 million British Electricity 4¼ per cent guaranteed stock, 1974-1979, at the price of 100 per cent. The proceeds of the issue are to be used to repay temporary borrowing and for other authorized purposes. Temporary borrowing by the Authority amounted to £92,535,000 at 31st March last.

C. A. Parsons & Co., Ltd., report a net profit for 1952, after meeting all charges, including £1,337,500 for taxation, of £814,598, as compared with £1,037,452 for 1951. It is proposed to pay a final dividend of 7½ per cent (against 6¼ per cent), making 12½ per cent for the year on the doubled capital of £1.2 million (against an equivalent of 10 per cent).

Thomas Bolton & Sons, Ltd., held their annual meeting on 15th April, Mr. P. V. Hunter (chairman) presiding. In his circulated statement, the chairman said that the year under review had produced a record trading profit. The continuing high price of copper was not only seriously inflationary, but was having unfortunate effects on their trade. Some customers were being forced, as a result of the high prices, to adopt as substitutes materials which were technically less suitable than copper and its alloys. A free market had now been opened for tin, lead and spelter, and it was to be hoped that before long dealings in copper would also be permitted, so that the price would be allowed to find its own proper economic level. Although trading conditions in 1952 were good, the closing months brought a sudden change; the rate at which orders were obtainable dropped seriously, with the result that they ended the year with a smaller order book than they had had for some considerable time.

G. & J. Weir, Ltd., reports a consolidated group surplus for 1952 of £570,398, after meeting all charges, including £865,194 for taxation. This compares with a surplus of £494,493 for the previous year. Reserve receives £200,000, and it is proposed to pay a final dividend of 12 per cent, making 17 per cent for the year on capital as increased by a 200 per cent scrip bonus. The distribution for 1951 was 45 per cent on the smaller capital.

Bylock Electric, Ltd., held its annual meeting on 16th April, when Mr. C. E. Mathes (chairman), who presided, said that the year 1952 was not an easy one, but they had managed to surmount a number of difficulties and he was confident that given normal trading conditions the position of the company could be maintained and improved. The output and sales in the current financial year were running at a rate of something like 20 per cent above the level of 1952. Shareholders were being invited to subscribe for additional shares at par for the purpose of financing the extension of the works, and to provide additional working capital.

On Saturday last details were announced of the rights issue. Shareholders are offered two 1s ordinary shares at par for each ordinary share held. The issue will produce a gross sum of £30,000. It is not being underwritten, but the directors have agreed to subscribe at par, free of commission, for any shares not taken up by shareholders.

Newman Industries, Ltd.—In our issue of 3rd April (p. 754) there was a reference to Newman Industries' 5s shares. We regret that this was a misprint for 2s shares.

Liquidations

Cyril French, Ltd., radio distributors.—Winding up voluntarily. Liquidator, Mr. J. B. Howse, 15, Cromwell Road, London, S.W.7, appointed 31st March. This is a members' voluntary winding-up and all creditors have been or will be paid in full.

Bankruptcies

D. J. Chambers and **W. Mackett,** formerly carrying on business in partnership as electrical contractors, under the style of I.D.C. Electrical Appliances, at 15-17, High Street, Hounslow, Middx. (Separate application of D. J. Chambers.—Application for discharge to be heard on 15th May at the Court House, Half Acre, Brentford, Middx.

H. J. A. Wade and **C. L. Wade,** carrying on business as C. & H. Wade & Co., at 40, Dulwich Road, Herne Hill, London, S.E.24, lately carrying on business at 68, Brixton Water Lane, Brixton, S.W.2, electrical engineers and contractors.—Mr. W. F. Cresswell, Bankruptcy Buildings, Carey Street, London, W.C.2, Senior Official Receiver, released 10th April, 1953.

T. Sarginson, 1, Dragley Beck, Ulverston, Lancs, lately carrying on business at the Market Hall, Ulverston, electrician.—Last day for receiving proofs for dividend 6th May. Trustee, Mr. D. Atkinson, 14, Lowther Street, Carlisle, Official Receiver.

A. Parsons, 23, Clifton Crescent South, Rotherham, Yorks, lately carrying on business at 25, High Street, Rotherham, electrician.—Receiving order dated 7th May, 1931, rescinded, order of adjudication date 7th May, 1931, annulled, and petition filed 7th May, 1931, dismissed, debts having been paid in full.

J. Shelvey, carrying on business as "Vesta-Shelvey Electric Installations," at Vesta Manufacturing Works, L.M.S. Goods Department, Oakengates, Salop, electrical engineer. Trustee, Mr. F. C. Ormrod, 12, Lonsdale Street, Stoke-on-Trent, Official Receiver, released 10th April, 1953.

STREET LIGHTING

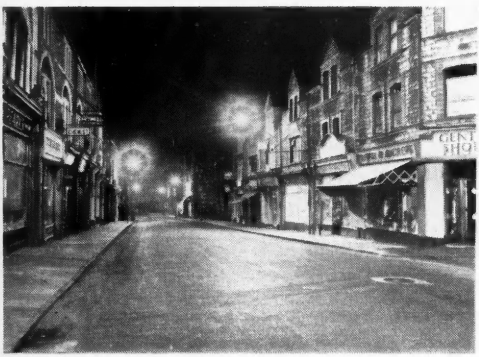
Further Conversion Schemes

ONE of the biggest single schemes of sodium vapour lighting in the West Country is planned for BARRY, seaside resort of the mining and industrial areas of South Wales and the Midlands. It will eventually cover eleven miles of roadway. The Mayor, Alderman K. C. Steer, J.P., recently inaugurated the installation by switching on the first 110 lanterns along 3½ miles. The new lighting, which is centrally operated by means of ripple control, has been planned by the surveyor to the Council, Mr. J. Proctor, and installed by the South Wales Electricity Board. The lanterns, sodium vapour lamps and control gear have been supplied by the British Thomson-Houston Co., Ltd. The lanterns in the busy shopping areas are mainly mounted on wall brackets.

COVENTRY Corporation is recommended to approve a scheme for improved street lighting at an estimated cost for the erection of approximately 290 lamps (including the removal of existing standards) of £15,000. Details of the scheme are: Warwick Road, £700; Kenilworth Road and Leamington Road, £2,000; Holyhead Road and Birmingham Road, £4,200; Stoney Stanton Road, £4,000; Radford Road, £750; Allesley Old Road, £1,700; Coundon Road and Barkers' Butts Lane, £750; Walsgrave Road, £600; and Springfield Road and Eagle Street, £300.

WALLASEY Housing Committee has approved a scheme for the provision of street lighting on housing site P.7 and application is to be made for sanction to borrow £1,560 for the work.

Part of the new installation of Mazda sodium vapour street lighting in Barry



With a view to the possible conversion of street lighting from gas to electricity, BLACKBURN Corporation has asked its borough engineer for comparative figures of maintenance and consumption costs.

SOUTHEND Highways Committee has approved a £4,400 sodium lighting scheme in Prince Avenue.

WISBECH Corporation has received Transport Ministry approval for a £2,990 street lighting scheme.

HADLEY (Salop) Council is applying for loan sanction to carry out the first stage of a scheme for the provision of electric street lighting throughout the area.

New fluorescent lighting, to mark the Coronation, is to be installed by MARKET HARBOROUGH (Leics) U.D.C. in part of the town.

DEWSBURY Water and Street Lighting Committee has approved detailed schemes for the conversion from gas to electricity of the street lighting in various roads at a total cost of £2,860 for the financial year 1953–54 and £2,565 for the year 1954–55.

WASHINGTON (Co. Durham) U.D.C. is seeking £2,086 loan sanction for installing improved public lighting on roads A.182 and B.1289.

SOUTH AFRICAN NEWS

From Our Cape Town Correspondent

ELECTRICAL engineers from George, Knysna, Mossel Bay and Oudtshoorn met recently to discuss the possibility of constructing a power station in the south-western districts to supply power for the development of the region.

A local loan of £4,000,000 offered for public subscription on behalf of the Electricity Supply Commission was fully subscribed. Interest is at 5 per cent, with the issue price at £100 per cent. The loan will mature in 1967–69. The proceeds are to be used to repay temporary borrowings.

Mr. G. F. Falk, a director of Falk, Stadelmann & Co., Ltd., said in Cape Town that his company planned to open a factory in South Africa to manufacture goods which now had to be imported. It was waiting for the necessary authority before proceeding with the installation of the machinery. Mr. Falk said that South Africa was expanding rapidly, and a demand was being created for locally-made goods. The country had a great industrial future and was ideally situated to supply the Far East and Australasia.

A waterfall of melted snow from the 2,000 ft Jan Smuts Peak on Marion Island is to provide hydro-electric power. A working party to undertake the construction of this plant is to be landed on the island next February.

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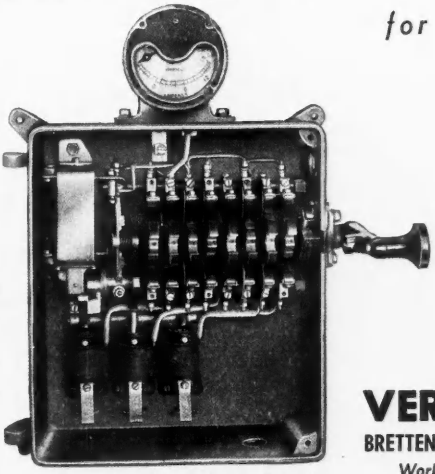

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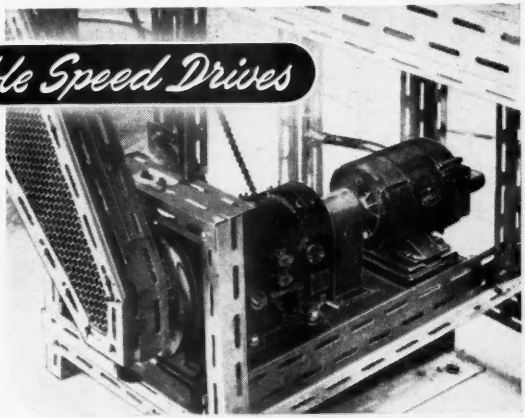

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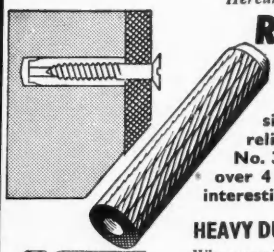
FIXING DEVICES

Approved by Local and Government authorities

Hereunder are a few of the Rawlplug Fixing Devices which may be of interest

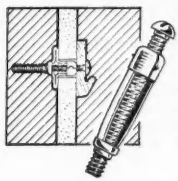
RAWLPLUGS AND RAWLTOOLS



You will ensure that a screw has a permanent stronghold in Brick, Concrete, Stone, Tile, Cement, Marble or Glass if you use a Rawlplug. RAWLPLUGS grip by expansion against the solid sides of the hole, providing clean, neat, reliable fixings. There is a Rawlplug for every size of screw from No. 3 for light wiring to No. 30, which will take a direct load of over 4 tons. Ask for free Rawlplug reference chart, which gives interesting technical data and illustrates actual size of Rawlplugs.

HEAVY DUTY FIXINGS

Where very heavy loads have to be carried there are Rawlbolts from 3/16" to 1" diameter and Bolt Anchors or Rawltamps which can be fixed quickly with the least labour and disturbance to surrounds.



CAVITY FIXINGS

There are several Rawlplug fixing devices each having its particular advantages for this class of work. Each is suitable for blind fixing in hollow materials or partition walls and will take fair loads.

We are exhibiting at the BRITISH INDUSTRIES FAIR, STAND C707, Birmingham, April 27—May 8

B441A

Write for free Descriptive Literature and Price List to : THE RAWLPLUG CO. LTD. · CROMWELL ROAD · LONDON · S.W.7

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 3rd June from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1948

9220. Standard Telephones & Cables, Ltd., Terry, V. J., Ridler, D. S., and Weir, D. A.—Start-stop telegraph repeaters. 25th March, 1949. (692411.)

9660. Philips Electrical, Ltd.—Ultra-high-frequency circuits. 6th April, 1948. (692182.)

11841. Standard Telephones & Cables, Ltd., Hartley, D. C., and Weir, D. A.—Telecommunication exchange systems. 29th April, 1949. (692412.)

25187. Standard Telephones & Cables, Ltd., and Hough, G. H.—Electric discharge tubes. 23rd September, 1949. (692415.)

1949

8606. Palumbo, T. R.—Electric resistors and method of manufacturing same. 30th March, 1949. (692303.)

8903. Standard Telephones & Cables, Ltd.—Gaseous discharge tubes and circuits therefor. 31st March, 1950. (692116.)

19249. Fairchild Camera & Instrument Corporation.—Machines for electrically producing screen relief image reproducing plates. 21st July, 1949. (692349.)

22648. Zaugg, S.—Electrical accumulators. 31st August, 1949. (692256.)

24811. Standard Telephones & Cables, Ltd.—Telegraph repeaters. 22nd September, 1950. (692423.)

29239. Radio Corporation of America.—Transistor amplifying circuits. 15th November, 1949. (692352.)

31853. Radio Corporation of America.—Three-electrode semi-conductor amplifiers. 12th December, 1949. (692353.)

33161. Frost, R. J.—Electric steam generators. 31st December, 1949. (692306.)

1950

4375. Davidson, A. D., and Scammell, E. W.—Electrically heated utensils. 21st May, 1951. (692307.)

5028. Electric & Musical Industries, Ltd.—Electric waveguides. 20th February, 1951. (692308.)

6439. Donovan Electrical Co., Ltd.—Electric switch fuse mechanism. 14th March, 1951. (692200.)

7432. Standard Telephones & Cables, Ltd.—Electric discharge tubes. 22nd March, 1951. Addition to 692415. (692128.)

12260. Ferranti, Ltd.—Servo-control systems. 16th May, 1951. (692203.)

15944. Standard Telephones & Cables, Ltd.—Electric pulse responsive circuits. 26th June, 1950. Divided out of 692411. (692436.)

16444. Pye, Ltd.—Circuit arrangement for controlling the frequency of the line time base oscillator in a television receiver. 10th May, 1951. Addition to 683947. (692359.)

19009. Dorman & Smith, Ltd.—Neutral mechanism of electric circuit breakers. 13th July, 1951. (692208.)

20174. Revo Electric Co., Ltd.—Rotary electric switches. 13th August, 1951. (692209.)

20837. English Electric Co., Ltd.—Indicating apparatus for use in sectionalized machinery. 17th August, 1951. (692311.)

22655. General Electric Co., Ltd., Adams, O., and Partridge, J. H.—Electrodes for electric glass melting furnaces. 12th September, 1951. (692442.)

22769. Kodak, Ltd.—Electronic timing device. 14th September, 1951. (692443.)

22962. Babcock & Wilcox, Ltd.—Plant for extracting dust from gas. 19th September, 1950. (692210.)

23249. Crabtree & Co., Ltd., J. A., and Morgan, R. W.—Electric terminals associated with switch or outlet socket contacts. 23rd July, 1951. (692211.)

1951

2674. Metropolitan-Vickers Electrical Co., Ltd.—Remote control apparatus. 11th January, 1952. (692319.)

3370. British Thomson-Houston Co., Ltd.—Method of supporting an electric lamp. 15th November, 1951. (692224.)

4140. British Telecommunications Research, Ltd.—Apparatus for detecting the movement of objects of magnetic material. 7th February, 1952. (692226.)

5136. General Electric Co., Ltd., Breadner, R. L., and Simms, C. H.—Manufacture of hollow glass vessels, such as cathode-ray tube envelopes. 29th February, 1952. (692228.)

6776. Associated Electrical Industries, Ltd.—Automatic voltage equipment for electrical alternators. 13th February, 1952. (692379.)

7430. Philips Electrical Industries, Ltd.—Blocking oscillators. 30th March, 1951. (692231.)

8407. Auwaerter, M.—Electric discharge devices for the measurement of high vacuums. 11th April, 1951. (692232.)

10670/2. Standard Telephones & Cables, Ltd., Terry, V. J., Ridler, D. S., and Weir, D. A.—Start-stop telegraph repeaters. 25th March, 1949. Divided out of 692411. (692456/8.)

15665. Kauderer, G. C. F., and Kauderer, J. A. G., trading as Handels-Vennootschap Onder de Firma Technische Import, Export en Fabricage Amroh.—Electromagnetic sound recording and reproducing apparatus. 2nd July, 1951. (692330.)

16186. Eisemann Ges.—Electric hair-dryers. 9th July, 1951. (692288.)

17402. British Thomson-Houston Co., Ltd.—Contact pin crimping machine. 23rd July, 1951. (692289.)

17403. British Thomson-Houston Co., Ltd.—Electric contact pin and lead wire assemblies. 23rd July, 1951. (692290.)

17766. Marconi's Wireless Telegraph Co., Ltd.—Circuit arrangements for converting amplitude modulated pulses into pulsating d.c. voltage. 26th July, 1951. (692461.)

18888. Fairchild Camera & Instrument Corporation.—Machines for electrically producing screen relief image reproducing plates. 21st July, 1949. Divided out of 692349. (692400.)

19255. British Thomson-Houston Co., Ltd.—Cam-actuated electric switches. 15th August, 1951. (692238.)

19994. Radio Corporation of America.—Electron-discharge devices. 24th August, 1951. (692239.)

20009. Siemens & Halske Akt.-Ges.—Electrical apparatus. 24th August, 1951. (692464.)

21774. Philips Electrical Industries, Ltd.—Flashlight bulbs. 17th September, 1951. (692240.)

24715. Sperry Corporation.—Arrangements for coupling electromagnetic waveguides. 23rd October, 1951. (692336.)

24814. Standard Telephones & Cables, Ltd.—Electron beam tube arrangements. 24th October, 1951. (692337.)

25075. Philips Electrical Industries, Ltd.—Electron-optical image intensifiers. 26th October, 1951. (692242.)

25264. Landis & Gyr Akt.-Ges.—Movable system of sensitive pointer-indicating measuring instruments. 29th October, 1951. (692243.)

27328. British Thomson-Houston Co., Ltd.—Frequency multipliers and oscillators. 21st November, 1951. (692245.)

27495. Bosch Ges., R.—Electric condensers in which a metal coating is vaporized on to a dielectric. 23rd November, 1951. (692404.)

28281. British Thomson-Houston Co., Ltd.—Electronic control circuits. 3rd December, 1951. (692405.)

28591. Hoover, Ltd.—Suction cleaners. 6th December, 1951. (692298.)

29259. Busch-Jaeger Ludenscheider Metallwerke Akt.-Ges.—Cam-operated electric switches. 13th December, 1951. (692246.)

1952

347. Standard Telephones & Cables, Ltd.—Circuit arrangement for adjusting the inductance of a tuned oscillator circuit. 4th January, 1952. (692339.)

1376. British Thomson-Houston Co., Ltd.—Electric incandescent lamps. 17th January, 1952. (692299.)

1984. Philips Electrical Industries, Ltd.—Frequency demodulation circuits. 24th January, 1952. (692247.)

3010. Philips Electrical Industries, Ltd.—Electric insulators. 5th February, 1952. (692468.)

3991. Landis & Gyr Akt-Ges.—Integrating electricity meters of the induction type. 14th February, 1952. (692248.)

4241. British Thomson-Houston Co., Ltd.—Insulated electric conductors. 18th February, 1952. (692469.)

5624. Western Electric Co., Inc.—Methods of making semi-conductive bodies. 4th March, 1952. (692250.)

NEXT WEEK'S EVENTS

Monday, 27th April to Friday, 8th May

LONDON AND BIRMINGHAM.—British Industries Fair.

Monday, 27th April

BIRMINGHAM.—James Watt Institute, Great Charles Street, 6 p.m. I.E.E. South Midland Radio Group. Annual general meeting. "The Transmission of Pictures by Radio," by A. W. Cole and J. A. Smale.

ENFIELD.—George Hotel, 7.30 p.m. Purchasing Officers' Association, North London Branch. "The Purchasing Officer and Interdepartmental Co-operation," by H. H. C. Wood.

LEEDS.—The University, 7.30 p.m. Incorporated Plant Engineers, West and East Yorkshire Branch. Ten minute talks by Branch members.

LONDON.—Savoy Place, 7 p.m. I.E.E. London Students' Section. "Teleprinter Automatic Switching," by P. J. MacMahon.

Tuesday, 28th April

LONDON.—Savoy Place, 5.30 p.m. I.E.E. Measurements and Supply Sections. "Meter Problems and Consumers' Load Characteristics," by L. B. S. Golds and P. Schiller. (Joint meeting.)

Manson House, Portland Place, W.1, 6.30 p.m. Society of Instrument Technology. "A New Method of Electrical Recording suitable for Multi-Channel Working," by S. S. Carlisle.

WOLVERHAMPTON.—Star and Garter Royal Hotel, 7 p.m. Institution of Works Managers, Wolverhampton Branch. Annual general meeting.

Wednesday, 29th April

LONDON.—Savoy Place, 5.30 p.m. I.E.E. Supply Section. "An Assessment of the Impregnated Pressure Cable," by Dr. L. G. Brazier, D. T. Hollingsworth and Dr. A. L. Williams.

2, Savoy Hill, W.C.2, 6 p.m. Illuminating Engineering Society. Informal meeting. Discussion on "The Lighting of Pedestrian Crossings," opened by A. J. W. McIntosh.

John Adam Street, Adelphi, 2.30 p.m. Royal Society of Arts. "The Scientist's Place in the Services," by Dr. O. H. Wansbrough-Jones.

Thursday, 30th April

BRISTOL.—At Carwardines, Ltd., Baldwin Street, 7.15 p.m. Purchasing Officers' Association, West of England Branch. "Non-Ferrous Metals," by L. H. Taring.

LONDON.—Junior Institution of Engineers, 2.30 p.m. Visit to Lime Grove Studios of the B.B.C.

SHEFFIELD.—Grand Hotel, 7.30 p.m. Incorporated Plant Engineers, South Yorkshire Branch. Film and discussion on the making of glass.

Thursday, 30th April and Friday, 1st May

LONDON.—4, Grosvenor Gardens, S.W.1. Iron and Steel Institute. Annual general meeting.

Friday, 1st May

LONDON.—Townsend House, Greycoat Place, 7 p.m. Junior Institution of Engineers. Special meeting; film show.

Saturday, 2nd May

LONDON.—I.E.E. London Students' Section. Visit to London Airport. Meet at Institution Building, 8.45 a.m.

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 8th May.

QUALITON. No. 699,359, Class 9. Electrical instruments and apparatus included in Class 9; measuring instruments; calculating, counting, signalling and checking (supervision) apparatus; scientific instruments and apparatus; wireless telegraphic and telephonic instruments and apparatus; radio transmitting and receiving sets (complete); sound amplifying apparatus, talking machines, gramophone records, apparatus for the electric transmission of pictures, television apparatus, thermostats; photographic and cinematographic instruments and apparatus; chemistry instruments and utensils included in Class 9; and parts and fittings included in Class 9 of all these goods.—Elektroimpex Villamossagi es Finommechanikai Kulkereskedelmi Vallalat, Budapest, Hungary. Address for service, c/o W. P. Thompson & Co., 12, Church Street, Liverpool.

RAINBOW. No. 704,379, Class 9. Television receiving apparatus and component parts included in Class 9.—Rainbow Radio Manufacturing Co., Ltd., 28a, Mincing Lane, Blackburn, Lancs.

AUTOVOL. No. 714,335, Class 9. Electrical apparatus for regulating the operation of dynamo-electric machines by means of voltage control.—Laurence, Scott & Electromotors, Ltd., Gothic Works, Hardy Road, Norwich.

ADVOLT. No. B714,365, Class 9. Electrical apparatus for regulating and changing voltage.—Advance Components, Ltd., Advance Works, Back Road, Shernhall Street, Walthamstow, London, E.17.

DIAMEL. No. 714,366, Class 9. Electric resistance wire.—Johnson Matthey & Co., Ltd., 78, Hatton Garden, London, E.C.1.

VALRADIO. No. 714,791, Class 9. Radio apparatus and parts included in Class 9.—Valradio, Ltd., New Chapel Road, High Street, Feltham, Middx.

MICROMAC. No. 715,191, Class 9. Electric switches.—C. H. Parsons, Ltd., Britannia Works, Wharfdale Road, Tyseley, Birmingham, 11.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Alton.—1st June. U.D.C. Three sets of electrically driven vertical sewage pumps for drainage contract No. 2. John Taylor & Sons, engineers, Artillery House, Victoria Street, S.W.1.

Belfast. — 27th April. Northern Ireland Housing Trust. Electrical installations in a block of four shops and 14 flats at Rathcoole No. 1, Whitehouse. Specifications, etc., from offices of the Trust, 12, Hope Street.

Chorley (Lancs).—15th May. Clayton-le-Woods and Whittle-le-Woods Parish Councils. Supply, erection and servicing of 113 sodium discharge lighting units, and the supply of lanterns and electrical apparatus for the above, for the lighting of three miles of trunk road. W. Groves, engineer and surveyor, Council Offices, Gillibrand Street, Chorley, Lancs.

Durham.—4th May. County Education Committee. Electrical installation work at three schools. (See this issue.)

India.—New Delhi.—4th May. Director General, Supplies and Disposals. Supply of lead acid accumulators. (C.R.E. 13613/53. Ten/6173.)* 12th May. Lead acid and nickel cadmium cells for train lighting. (C.R.E. 13544/53. Ten/6171.)* 14th May. Supply of train lighting dynamos, etc. (C.R.E. 13443-4/53 and 13271. Ten/6148-0.)* 26th May. One 60 kW arc rectifier unit. (C.R.E. 13216/53. Ten/6144.)*

Liverpool.—30th May. Waterworks Committee. Supply, erection and maintenance of three booster pumping plants, comprising nine booster pumps complete with variable speed motors, switchgear, etc., for the Vyrnwy aqueduct scheme. Water engineer, 55, Dale Street.

New Zealand.—20th May. N.Z. Post Office. Instrument cordage and cords. (C.R.E. 13256/53. Ten/6146.)*

Dunedin.—6th July. City Electricity Department. One or alternatively two 15 MVA transformers for Halfway Bush substation. (C.R.E. 13501/53. Ten/6157.)*

North of Scotland.—Hydro-Electric Board. H.v. and l.v. lines in Kincardineshire. (See this issue.)

Salford.—16th May. Corporation. Electric lamps and cables for the year ending 30th June, 1954. (See this issue.)

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (Trafalgar 8855).

South Africa.—Durban.—1st May. City Electricity Department. Supply of twelve 550 V switch panels. (C.R.E. 13828/53. Ten/6170.)* 15th May. Supply of ten e.h.v. 11,000 and 6,600 V, 150 MVA switchboards. (C.R.E. 13829/53. Ten/6175.)* Four 5-panel e.h.v. switchboards, Contract No. E.2415. (C.R.E. 13827/53. Ten/6169.)*

Thornaby-on-Tees.—Town Council. Installation of electricity in houses in the Northumberland Road area. Borough engineer, Town Hall.

United States.—Walla Walla District.—5th May. Corps of Engineers. Six 56,500 kVA main-unit transformers. (C.R.E. 13392/53. Ten/6179.)*

Wiltshire.—21st May. County Education Committee. Electrical installation in new junior school, Penhill, Swindon. (See this issue.)

Wolverhampton.—20th May. Corporation. Street lighting equipment. (See this issue.)

ORDERS PLACED

Bromley. — Corporation. Recommended. Provision of fluorescent lighting in Beckenham Lane, part of Masons Hill, part of Widmore Road, and East Street (£3,582).—General Electric Co., Ltd.

Durham.—City Council. Electrical installations in 320 houses (£4,966).—S. E. White, Coxhoe.

Scarborough.—Parks Committee. Electrical work in connection with the reconstruction of the storm-damaged North Bay bungalows (£1,427).—J. G. Appleyard.

Stockport.—Recommended. Electrical installation at the Offerton Secondary Modern Girls' School (£5,507).—Hallams (Electrical Contractors), Ltd.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Accrington.—Warehouse for Evans & Co. (Accrington), Ltd.; Bell Eastham & Heap, architects, 8, Bank Street.

Appledore (Devon).—Houses and bungalows (50) at Western Hill site; U.D.C. surveyor, Windmill Lane, Northam, North Devon.

Barking.—Houses (160), Bradfield Drive, and proposed central depot on site in Ripple Road; E. R. Farr, town clerk, Town Hall.

Barnsley.—Extensions to Mining and Technical College; Lyons & Israel, architects, 26, Seymour Street, London, W.1.

Bedlington.—Houses (224), East View estate; U.D.C. surveyor.

Birkenhead.—Houses (52), Prenton Dell estate; Dell Investments, Ltd., Russell Road.

Birmingham.—County secondary modern school at Wheelers Lane, King's Heath, primary school on site fronting Braithwaite Road, Sparkbrook, county secondary technical school in the Bournville area, three-storey flats at Shard End (42), dwellings at Clopton Road, Garrett's Green (42), and six blocks of flats at Lakey Lane, Hall Green; H. J. Manzoni, city engineer, Civic Centre.

Carlisle.—Additions to biscuit factory for Carr & Co., Ltd. (£50,000); John Laing & Sons, builders, Dalston Road.

Cheltenham.—Houses (34), Oldfield Court estate and Kingsley Gardens, St. Marks; Rainger, Rogers & Smithson, architects to T.C., 29, Rodney Road.

Colne.—Houses and flats (56), Kingsley Road site; borough surveyor, Town Hall.

Dawley (Salop).—Welfare centre; C. H. Simmons, county architect, Column House, London Road, Shrewsbury.

Doncaster.—Civic Centre, and ambulance station and garages on the Green House site, Wheatley; borough architect.

Finchley.—Modern school in Summers Lane (£174,870); Middlesex county architect, 10, Great George Street, S.W.1.

Gateshead.—Additions to Fountain's View Old People's Home (£17,000); Spence & Price, architects, 26, St. Mary's Place, Newcastle-on-Tyne.

Glossop.—Dwellings (118), Pyegrove site; G. A. Lomas & Co., Ltd., Lingard Lane, Bredbury, nr. Stockport.

Hawarden.—Pumping station at Garden City, Sealand, for R.D.C.; Elliott & Brown, engineers, Stanley House, Pelham Road, Nottingham.

Heywood.—Houses, Egerton Street site (114) and Barker Street (12); A. Middleton, borough surveyor, Municipal Buildings.

Hornchurch.—Houses (52), Upminster Park estate, Front Lane, Cranham; P. L. Cox, clerk to U.D.C., Billet Lane.

Ilford.—Flats (200) on five sites; K. F. B. Nicholls, town clerk, Town Hall.

Ilkley.—Houses at Menston (32) and Woodlands (8), and flats at Menston (16), and Valley Road (24); A. Skinner, U.D.C. surveyor, Chantry Drive.

Liverpool.—Shops, houses, flats and assembly hall, Croxteth estate; city architect.

Erection of Booker Avenue County Infants' School; H. Brookfield & Son, Ltd., 23, Mayfield Road, Liverpool.

Longbenton.—School (£90,000); county architect, County Hall, Newcastle-on-Tyne.

Longhoughton.—Houses (22); Reavell & Cahill, Lloyds Bank Chambers, Alnwick.

Manchester.—Factory, Wythenshawe estate for Sharston Engineering Co., Ltd.; Major Bull architect, 73, High Street, Cheadle, Cheshire.

Extensions at Newton Heath Technical College G. & J. Seddon, Ltd., Little Hulton, nr. Bolton.

Middlesbrough.—Factory additions for Lionweld, Ltd., Marsh Road.

Houses (122), Heythrop drive; E. T. Sweeting & Son, builders, Back Haymore Street.

Morpeth.—Houses (25), Spelvit Lane; F. K. Perkins, borough engineer.

Northumberland.—Central cooking depot at Seaton Burn (£25,000); A. Carr, builder, 71, Stoddart Street, Newcastle-on-Tyne.

Blind workers' hostel, Low Willington Housing estate, Wallsend; county architect, County Hall, Newcastle-on-Tyne.

Plymouth.—Scheme for markets, shops, etc., in the city centre; J. Paton Watson, borough surveyor, Guildhall.

Pudsey.—Houses and flats on the Cemetery Road North site (120), and flats on the Southroyd Park site (22); W. R. Cruse, town clerk, Town Hall.

Runcorn.—Houses at Dudley Avenue and Fairfax Drive (24); Marley Building Co., Ltd., Sale, Cheshire.

Salford.—Grammar school; Taylor & Young, architects, Oxford Road, Manchester.

Shipston-on-Stour.—Dwellings (36) for R.D.C.; G. Foster, Ltd., Leamington Road, Broadway, Worcestershire.

South Shields.—Houses (529) and four shops at West Simonside; borough engineer, Town Hall.

Standish.—Houses and flats (128), Lark Hill; U.D.C. surveyor, Council Offices, Standish, near Wigan.

Stockton-on-Tees.—Houses (80) and flats (70), Portrack site, and houses (3,000), Hardwick estate, T.C.; borough architect, 28, The Square.

Stratford-on-Avon.—Houses, bungalows and flats (74), Goose Lane site, and houses and bungalows (36), Quinton Village; L. C. Wakeman & Partners, architects to R.D.C., 126, Hagley Road, Edgbaston, Birmingham, 16.

Sunbury-on-Thames.—County grammar school for Middlesex E.C.; county architect, 10, Great George Street, London, S.W.1.

Sunderland.—New estate for 700 houses; borough engineer.

Tonbridge.—Houses (64), Higham Wood; B. Bishop, U.D.C. surveyor, Council Offices, The Castle.

Wallsend.—Home for blind persons; county architect, County Hall, Newcastle-on-Tyne.

Wantage.—Houses (49) in various parishes; L. Woodgate, clerk to R.D.C., Council Offices, Belmont.

Warrington.—First phase of technical college scheme for Lancashire E.C.; county architect, Fishergate Hill, Preston.

Wolverhampton.—Secondary schools at Wobaston (£174,000), Underhill (£184,000) and St. Anthony's (£40,040) in 1954-55 programme; J. Brock Allon, town clerk, Town Hall.